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IN ITS 76th YEAR

December 19 1959

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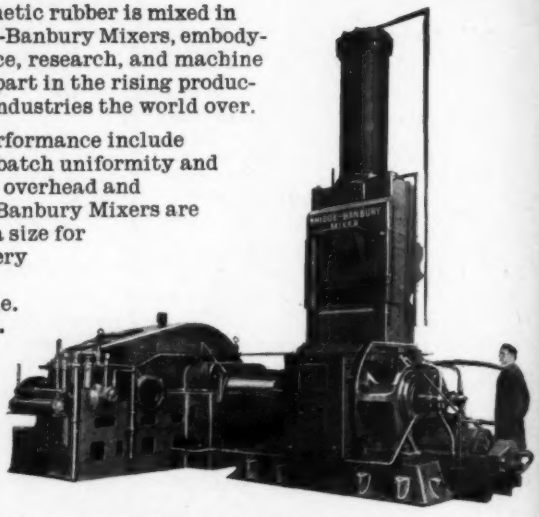

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NOTES of the WEEK

Scientific Manpower

IN January 1959 there were in this country, in all fields of employment, about 173,000 scientists and engineers. There were also 43,000 holders of Higher National Diplomas and Certificates. Forecasts of requirements by 1962 would call for an increase on the 1959 figures of 20% in scientists and 22.7% in engineers. These figures were given in a report by the Advisory Council on Policy's Committee on Scientific Manpower presented to Parliament last week. This brings up to date the information contained in a 1956 report on similar lines which included employers' forecasts of requirements by 1959. The present report contains the results of a further inquiry by the Ministry of Labour into the employment of qualified scientists and engineers in 1959 and employers' forecasts of requirements by 1962. It also includes information about the supply of scientists and engineers, and the extent to which demands in the next three years are likely to be met. More scientists and engineers qualified during the three years 1956-58 than the Committee thought would be possible in 1956 (41,000 as compared with a forecast of 36,000). But at the beginning of 1959 employers reported over 6,000 vacancies in manufacturing industry alone. During the three years 1959-61 the Committee estimates that over 51,000 scientists and engineers will qualify but that the numbers available for employment in Great Britain will still fall short of employers' forecasts of requirements.

Appendices to the Report, in this case under the heading 'Other Manufacturing (*e.g.* rubber, plastics, sports goods, films, etc.)' show that of the scientists and engineers in this group, research and development accounted for 516 in 1956 and 763 in 1959, while all other work accounted for 692 and 859 for the respective years. It is interesting to note the figures for scientists and engineers as a percentage of the total employed. Highest percentage is for mineral oil refining (1959, 7%) followed by chemicals and allied trades with 3.7% for 1959. For the group including the rubber and plastics manufacturing industries the figure was 0.8% for 1959 (against 0.6% for 1956). Estimates from this group for 1962 requirements of scientists and engineers are that these will be 17.8% over the 1959 figure of 1,622.

On with Education

THE details contained in the report mentioned above are not without a bearing on the work of the recently instituted Joint Committee on Education and Training set up by the Plastics Institute and the British Plastics Federation, which was referred to on this page last week. That the report on scientific manpower estimates a shortfall in the requirements of scientists and engineers by 1962, in spite of more in this category coming forward during the next three years, provides only further emphasis on the importance of the moves now set in motion by the PI and BPF Joint Committee. It indicates also that those in the plastics industry who concern themselves with education are very much on the ball. The Report of the Central Advisory Council for Education, also published last week, presents another facet of the education picture. The Council, under the chairmanship of Sir Geoffrey Crowther, in their report '15 to 18,' put forward a formidable list of recommendations, one of which was that the school-leaving age should be raised to 16.

The Richest Vein

DETAILS of this massive report have already been widely publicized, but mention may be made here of the stress laid in the report on the group of young people who leave school and go on to further education. The group, that is, between the brightest 25% in grammar schools and the great mass of ordinary children who leave school at or about the statutory leaving age. It is in this group that the Council believes the greatest deficiencies are to be found and at the same time the richest vein of untapped human resources which has to be exploited 'if this country is to keep a place among the nations that are in the van of spiritual and material progress.' The report emphasizes the need, clearly recognized, incidentally, by the education committees of the rubber and plastics industries, to produce far greater numbers of technicians and craftsmen to meet the technical challenge in the years ahead. It is interesting also to note that the Council recommend that, for technicians, sandwich courses should in future be regarded as the standard and only satisfactory method of studying and every effort should be made to secure their adoption for this level instead of part-time courses. In this case again, in the rubber and plastics industries, there has been a steady, but rather too slow, increase in the numbers taking such courses. The 'Crowther Report' should provide a valuable fillip to the spread of the ideas and enthusiasm of those in our industries who work so hard in the causes of scientific and technological education and training.

Christmas Greetings to all our Readers

NEWS *Briefs*

CEYLON STRIKE—WEST GERMAN PLANT FOR USSR—PAKISTAN IMPORTS—SOUTH AFRICAN SR PROJECT—US POLYPROPYLENE—ISRAEL

●**Guatemala** — Arrangements have been made whereby the Guatemalan company, General Tire and Incatecu, S.A., will manufacture 'Goodyear' tyres for the Central American market.

●**Malaya**—Foreign imports of rubber into Singapore and the Federation of Malaya during November amounted to 42,055 tons as shown by final documents received, according to preliminary figures issued by the Chief Statistician. This figure included 15,216 tons imported on provisional permits in previous months for which final documents had been received and excluded approximately 23,379 tons imported during the month for which final documents had not yet been received. The comparative figures for October were 41,919, 17,481 and 17,495 tons respectively.

●**Russia**—Plant for a polythene unit with an annual production of 24,000 tons a year is to be supplied to the USSR by the West German firm of Berg- and Hüttenbetriebe AG.

●**Mexico**—Petroleos Mexicanos proposes investing 72m. pesos in the construction of synthetic rubber plants in Tampico, Tamaulipas, Mexico. The new industry is intended to go into production at the beginning of next year.

●**Ceylon** — Thirty thousand striking plantation workers in the Nawalapitiya district in central Ceylon have agreed to return to work after their employers had said they would associate themselves with the workers' demand for an inquiry into police firing last week. Three workers died as a result of the firing after disturbances were reported on an estate in the Nawalapitiya district. Meanwhile, the Executive Committees of Ceylon's three major plantation unions have met to consider strike action against tea, rubber and cocoa estates to press their demand for an official inquiry into last week's shootings. About 600,000 estate workers would be involved, if a strike is launched.

●**South Africa** — The Industrial Development Corporation of South Africa has announced that it is to form a development company to investigate further the production of synthetic rubber in South Africa. If it is found that such production is economical then an operating company will be formed. The Corporation said the world's natural rubber plantations could not keep up with demand. Thus several countries had already built synthetic rubber plants. South Africa was the world's ninth most important consumer of rubber and the value of present imports exceeded £6,000,000 per year, it was added.

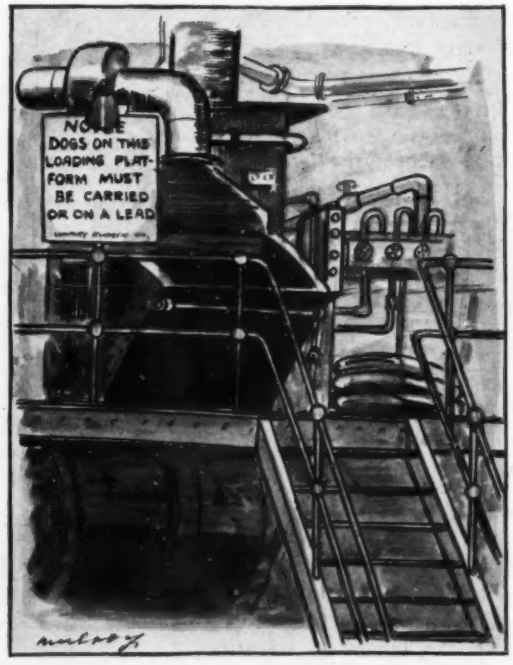
●**Israel**—It is reported that the Haifa oil refinery is to provide the raw materials for a new polythene plant to be built by Makhtesheim Chemical Works Ltd.

●**United States**—For the second time within a month the Dayton Rubber Co., Asheville, North Carolina, has announced a price increase for all latex foam products manufactured by its Koolfoam Division. The company said that a general increase of approximately 10% was being made on all latex foam products, effective on December 14. Product categories including slabs, moulded cushions, building stock and mattress cores are affected.

●**Italy**—Naugatuck-Rumianca, Spa, a recently-formed company jointly owned by United States Rubber Co. and the Rumianca Co. has begun operation of a newly-built plant in Turin. Tonnage lots of BLE, which combats the ageing effects of heat and oxygen, are being produced. Scheduled for early production is Polygard, a non-staining stabilizer.

●**New York**—The Avisun Corporation reports commercial production of high clarity high strength polypropylene film for packaging applications at manufacturing facilities at New Castle, Delaware. The facilities, which are said to have a capacity of 10,000,000lb. a year, will produce the film—trade name Olefane—in thicknesses from one to four mils for general packaging usage, and sheets from four to 20 mils for thermoforming. Avisun claims to be the first fully-integrated polypropylene film producer to offer this product in commercial quantities.

●**Costa Rica**—Modifications made to the 1955 Treaty of Free Trade between Guatemala and Costa Rica allow for free interchange of goods including natural and scrap rubber, tyres, etc. The reciprocal import quota has been fixed at 10,000 tyres for the first year, with annual increases after that of 10,000 tyres per year until free trade without quantitative restrictions is reached.



●**United States**—Eastman Kodak plans to build in Longview, Texas, a plant to produce about 20m. lb. annually of polypropylene plastic, the company announces. No estimate of cost has been disclosed.

●**Pakistan**—Provisional figures released by Pakistan's Central Statistical Office, show that imports of rubber manufactures during September 1959 totalled Rs.2,927,000.

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Patent Caoutchouc Case of 1836

NEW LIGHT ON THE EARLY HISTORY OF THE BRITISH RUBBER INDUSTRY

By H. SCHURER, Ph.D., F.L.A.

AT the end of February 1836, before the Court of Common Pleas, presided over by the Lord Chief Justice, there took place a trial which has entered the annals of the British rubber industry by its contemporary name, 'the patent caoutchouc case.' The plaintiffs were the well-known firm of Charles Macintosh. The defendant was equally well known, Wynne Ellis, the richest silk merchant in England, famous for his great art collection—part of which is now in the National Gallery—and active in politics. The Macintosh firm sued Ellis' firm, Everington and Ellis, for infringement of patent. The lawsuit created a considerable stir at the time. The chief counsel for the plaintiffs were the Attorney General, Sir John Campbell (later Lord Campbell), for the defendants Serjeant Wilde.

The patent under discussion was the well-known specification of Macintosh's of 1823 for the manufacture of the celebrated waterproof cloaks, as *The Times* called them in December 1835. By great good luck a manuscript report has survived giving very full details of the trial, details which do not appear in the printed accounts of the suit, although one of these is quite extensive. This manuscript report has not been drawn on in the literature so far, and it was to be hoped that it would shed new light on the early history of the rubber industry. This hope has been found justified, new facts have been discovered and new aspects emerge which supplement the two standard accounts of the period by contemporaries, Thomas Hancock's 'Narrative' and George Macintosh's 'Memoirs' of his father Charles. The evidence presented at the trial and fully reported in the manuscript account opens up the whole panorama of the first steps of the industry and brings out some aspects hitherto neglected.[1]

Syme-Thomson-Macintosh Triangle

Let us recapitulate the lines of development which led up to the infringement of the patent in 1835. Charles Macintosh, Glasgow manufacturer of dyes and mordants for the textile industry, had important contacts in the world of science. In London, his great friend was Dr H. W. Wollaston, the leading spirit of the Chemical Club, in Glasgow the Regius professor of chemistry, Thomas Thomson.

When Macintosh's son, George, went to Sweden to arrange for supplies of lichen for his father's dye manufacture, he would buy Swedish scientific books for Thomson as we know from Thomson's corespondence with the great Swedish chemist Berzelius[2]. When in 1818 Thomson got his chair in Glasgow, Macintosh, then a man of 52, went out of his way to go and attend his lectures at the university. And it was to this prominent academic chemist in Glasgow that in this same year 1818 a young eighteen-year-old Edinburgh medical student, James Syme, wrote a letter announcing his discovery that coal tar naptha was an efficient solvent for rubber.[3]

The web Macintosh-Thomson-Syme could hardly have been more close. To speak of a 're-discovery' of the solvent function of naphtha by Macintosh, as it has recently been done, misses the point completely.

Syme Publishes His Solvent

As the events of 1818 had to have some bearing on the 1836 trial it should be mentioned that Syme had clearly seen the possibilities of waterproofing textiles with his solution. Many years later he was to write: 'I rendered various textures waterproof by brushing a thin solution of it into their interstices. A silk cloak which afforded complete protection from the heaviest rain and could be employed as a pitcher by turning up its skirt was an object of wonder to all who saw it.'[4] His friends advised him to take out a patent and have his discovery of the naphtha solvent and its application to textiles legally protected.

As Syme was set on a medical career and was to rise to eminence as a surgeon in later life — he decided instead to publish his discovery. The commercial possibilities of his process must have been obvious to his friends at the time. By the publication of his letter in Thomson's journal 'Annals of Philosophy,' the whole scientific world had been given the freedom of Syme's find.

Only one person took it at the time, Macintosh, combining it with a principle Syme had not thought of—and that was to make all the difference in practice. As the solvent had been published, the rubber solution by itself could not be made the subject of a patent claim, but its combination with another new idea could. That was the point of Macintosh's original contribution.

Macintosh's Patent of 1823

It may be possible that in 1818 Macintosh had already been considering the utilization of the waste products of the Glasgow Gas Works, in connexion with his dye manufacture. In 1819 he certainly made a contract with them to this effect, the first person to do so. Hitherto these waste products had been dumped a few miles outside the city. Upwards of 6,000 gallons of 'coal oil,' as the coal tar naphtha was then called, were annually taken by Macintosh from 1819 onward. As a manufacturer of auxiliaries for the textile industry, Charles Macintosh then hit on the brilliant idea to apply Syme's discovery to two-ply fabrics. In his famous patent of 1823, he did not claim the solution but solely the two-ply principle, the double-texture idea, as the novel proposal, although his patent was the first to mention coal tar naphtha as the rubber solvent. In June 1823 the first reference to the patent appeared in the 'London Journal.'[5]

'A chemist of Glasgow has discovered a simple and efficacious method of rendering woollen, silk or other cloth completely waterproof. This mode is said to be by dissolving caoutchouc (Indian rubber) in mineral oil which is procured in abundance at the gas works. Put 5 or 6 coatings of the mixture with a brush on one side of the cloth on which another piece of cloth is laid and pass the whole through between two rollers. The adhesion is so complete that it is easier to tear the cloth than separate the pieces which appear to consist of only one ply and are completely impervious to water. This kind of cloth must be a valuable commodity in a rainy climate.' Posterity is certain to agree with the last sentence.

An abridged version of the specification is given in the appendix to this article. Macintosh's patent caused great excitement in scientific circles as the evidence of the 1836 trial bears out convincingly. In the Chemical Club, Wollaston who together with David Brewster had been interested in

the physical properties of rubber, made the experiment of tearing Macintosh's double texture cloth asunder, to study any electrical phenomena which might result. Looking back on 1823 we can see that Macintosh had taken one of the first steps in the founding of a new industry.

To people with money to invest the situation at the time looked somewhat different. Too often had marvels been claimed for rubber, the unique substance, and too often had the hopes been disappointed. By 1823 even its use for surgical goods was on a very small scale, comparatively unimportant as this application was at the best of times. For this we have the testimony of Faraday.[6]

Macintosh's Search for Capital

Although Macintosh established a workshop at Campsie, near Glasgow, with a few workmen to start the manufacture of waterproofs straightaway in 1823, he was obviously extremely eagerly looking round for financial backing. None could be found in Scotland. During a trip to London in 1824 he established contacts with Wynne Ellis—eleven years later this man was to be the defendant of the 1836 trial !—and Wynne Ellis sent some of his silk fabrics to Glasgow to have them waterproofed. Yet nothing came of these negotiations. The resistance to adventures with the unmanageable substance was too great.

In the same year, Macintosh, however, was lucky enough to land some impressive government contracts for the new waterproof fabrics, and on the strength of these he came to an agreement with a Manchester firm of cotton spinners, the Birley brothers and a Mr Barton. How strongly the new backers of the venture felt the risky nature of their step is made abundantly clear in a passage in the Birley manuscripts. The papers of the firm leave no doubt about the apprehension with which the new partners went into their enterprise.

'Wishing to extend his business, he (Macintosh, H. S.) looked out for someone to join him with capital and was introduced to Mr Hugh Hornby Birley and his brother, Mr Joseph Birley. They were cotton spinners and manufacturers in Manchester and owned the premises on the east side of Cambridge Street. . . . For the purpose of carrying on the waterproof business, they erected the building now known as the Old Mill. They built it so that should the waterproof business prove a failure, it might be added to and converted into a cotton mill.'[7]

Macintosh clashes with Hancock

The 1824 arrangement was as follows: the solution was still to be made in Glasgow, while the proofing was transferred to Manchester. This division of labour began functioning in 1825. Hardly had it got into swing that the Scottish pioneer of the rubber industry came into a headlong collision with the London pioneer who was pulling on the same string but in quite a different manner. Macintosh had made his mark with his brilliant tackling of the problem of the rubber solution—textile combination. Hancock, while trying his hand at many approaches to the rubber problem, made his chief contribution by the equally brilliant development of the utilization of the mutual adhesion of rubber surfaces.

This great achievement had been the masticator, invented in 1820, but, unlike Macintosh's process, kept a profound secret. In the same way as Macintosh was associated with the textile industry as a chemical manufacturer, Hancock's masticator was not uninfluenced by textile machinery. The masticator has been compared to the shoddy maker's devil, and Hancock's discovery somewhat ironically termed a 'rather simple secret.' Many inventions have looked like that — after they have been made. It had taken seventy years before it occurred to anybody to apply a variation of textile machinery to the processing of the bottle rubber as it came from America.

So far the two paths struck out by the pioneers had not met. Their future alliance was to arise out of a sharp collision which had its origin in quite a different idea of Hancock's. In 1824 he secured some supplies of latex. He had no clear idea from which tree the stuff was derived, and called it by its genetic name for all rubber trees—*Hevea*. In all probability it came from *Castilloa elastica*, as the data given in Faraday's historically important analysis of Hancock's so-called *Hevea* latex show.

Hancock was obviously fascinated by latex. He would go back to latex in later years, despite all difficulties encountered. In 1824 he took out a patent for a leather substitute based on a textile combination using latex as a cement.

An early historian of the British rubber industry had this to say concerning the practical results of this specification. 'The practice of making articles with fresh juice had long been practiced . . . by Indians. . . Articles so prepared were without the disagreeable smell imparted by the solvents. . . . Mr Thomas Hancock accordingly took out a patent in 1824 to use the crude juice, but after great exertions it was found that supplies in sufficient quantities could not be obtained. However great the care of transport, very little was found in the casks in an uncoagulated state, and this, added to the cost of freight and other causes, soon led to the conclusion that the process possessed nothing to recommend it.'[8]

Undismayed by this defeat, Hancock developed the same idea in a new patent taken out in 1825. Instead of *Castilloa elastica* latex, he used rubber in solution, a mix of a rubber-coal oil solution and a turpentine-rubber solution. The influence of Macintosh's patent of 1823 on this proposal is unmistakable. Here are some of the salient ideas of Hancock's patent of 1825.

'The patentee employs a woven cloth made from wool, cotton, flax, or other fibrous materials as the basis of his artificial leather . . . which cloth is covered with the composition . . . consisting principally of the elastic gum which is to be spread even upon the cloth by a spatula. Upon this a quantity of wadding made of cotton, silk, flax, or wool is laid in a uniform layer. The whole being placed between boards is to be submitted to pressure by passing it through a pair of rollers.' The rubber was to be dissolved in 'oil of turpentine' and 'rectified coal tar.' The main use of this textile combination was to be for shoe soles.[9]

Repercussions of the clash at the trial

A sharp dispute arose between Macintosh and Hancock who at this time were not acquainted with each other. The Glasgow inventor felt his 1823 patent infringed by the London 'patent cork manufacturer' as Hancock was then described. Repercussions of the Macintosh-Hancock clash reached the Chemical Club in London, where ten years later a prominent member, Henry Warburton, M.P., was to recall at the 1836 trial that Hancock had 'something to do with shoe soles' which interfered with Macintosh's process or was alleged to. In the trial of 1836 the defence fighting a suit for infringement of the same patent would make the most of the conflict of 1825. Needless to say, not a work of the whole episode is breathed in Hancock's 'Narrative.' Only the manuscript account of the 1836 trial tells us anything about the 1825 crisis.

A Marriage of Convenience

Instead of fighting a bitter struggle the Manchester-Glasgow group and

the London firm decided to sink their differences — and to come to some sort of co-operation instead of engaging in battle. At the beginning of 1826 an arrangement was arrived at 'by which articles made under Mr Macintosh's patent should emanate from the establishment of the firm [of Hancock, H. S.],' as the 'Narrative' puts it. Coming after a conflict as the one of 1825, the settlement at first was obviously conceived in the spirit of maximal caution by Macintosh.

Hancock in the meantime had discovered that masticated rubber required a much smaller amount of solvent than the one Macintosh used. As the smell of the solution must have very much lessened the appeal to the potential purchasers of waterproofed cloaks, any reduction in quantity of solvent should have appeared to be a godsend to Macintosh. Yet, he obviously did not want to be dependent on Hancock's solution made in London by a secret process and declined to base his manufacture on it. In addition to his genuine and undoubted inventive genius Hancock must have possessed the gift of referring to processes described in the literature and clearly originated by others as if they were a deep secret locked up in his breast.

In February 1826 Faraday amazed the audience of the Royal Institution by demonstrating the waterproof fabrics made by Hancock (made according to Macintosh's recipe which was not mentioned) and impressed them by mysteriously hinting at 'Hancock's peculiar mode of liquefying rubber' and by crowning all this by stating 'Mr Thomas Hancock possesses the knowledge of a process by which rubber can be rendered fluid and yet retain the power of hardening and assuming its elastic state again.'[10]

Hancock's impact on the Macintosh Process

In 1830 Macintosh came round to adopting Hancock's masticated rubber solution for their Manchester manufacturer. The Glasgow workshop completely drops out of the picture. The various — now more complex—strands of the Macintosh Hancock Manchester–London combination were now arranged in a new pattern. The adhesion principle and the solvent principle coalesced by the use of the masticator in the production of solutions. Hancock still kept his masticator in London and masticated his rubber there, the rubber thus treated was made up in solution in the strictest secrecy in Manchester. In strict isolation from solution workshops there were the spreading workshops where the introduction of machinery invented by Hancock as well added yet another element of technical refinement—and secrecy to the manufacture.

The masticator in London was a secret, the use of the masticated rubber for the making up of the solution in Manchester was a secret, and the spreading machinery used in Manchester was a secret at well. None of these processes were protected by any patent specification. The defence in the 1836 trial made great play of the fact that with the arrival of Hancock on the scene in 1830 the entire mode of manufacture of the waterproof fabric underwent a profound transformation, that Hancock more or less swallowed Macintosh.

That since the Campsie days of 1823 and since the original specification a great many refinements and improvements had changed the original process out of all recognition seems undesirable, yet the basic principles of the two-ply construction and the use of coal tar naphtha did remain unaltered although the solution used no longer was an unmixed coal tar naphtha solution as it had been at the beginning in Glasgow.

After a fire in the London premises in 1834 the masticating was transferred to Manchester as well, so that a considerable atmosphere of secrecy must have enveloped the manufacture there. Steam power was now employed for both masticators and for spreading machines.

Prosperity at Last

It may not be entirely due to the one and only factor of Hancock's great improvements that the economic situation of the Manchester firm changed, but change it certainly did after he appeared on the Manchester scene. All the fame of the 'celebrated waterproof cloaks' had not made up for the depressing fact than on an overall estimate the rubber proofing venture in the first twelve years of its career had brought no profits. In 1915 a member of the Birley family wrote: 'the result of the first twelve years (*i.e.* from the early twenties to the early thirties) was nothing. The profits for some years were offset by losses in other years.'

The turn for the better after 1834 seems clear, although figures are incomplete. Anticipating slightly for the years after the 1836 trial, the following figures of the net profits of the Manchester Macintosh firm are available: 1831, £17,690; 1832, £19,964; 1835, £40,828; 1836, £70,708; 1839, £94,619.[11]

It should be borne in mind that up to October 1832 the duty on rubber had been 5d. per lb. which prevented any large scale imports. After that date, it was reduced to £1 per ton and imports leapt up.[12] We have to take the word of contemporary journals for that, as no figures are given in the official trade statistics in the 1830's.

On what a small scale the nascent industry was then still operating is clearly brought out by the amounts quoted of rubber used in the manufacture. On some occasions Hancock says 'often we used from three to four tons a week'—but the word 'often' renders any calculations impossible. The first year for which official rubber import figures are available is 1846 — and then the annual amount was only 150 tons! By 1846, and indeed before this date, the Macintosh-Hancock did not have the field to themselves either, and the quantities used in the thirties were bound to be somewhat more modest. In connexion with the issues arising during the trial it should be remembered that the making up of the cloth into articles and the retail sale was in the hands of the Macintosh-Hancock group in the thirties. Anybody selling their cloth would qualify as an interloper.

Leakage and Infringement

By 1834 or thereabouts the Macintosh waterproofing business started becoming really profitable. There was little time to rejoice about this, since an unpleasant surprise lay in wait for them. In 1835 the great silk firm of Everington and Ellis, wholesale and retail merchants — not manufacturers — began offering 'Fanshawe's Improved Patent India Rubber Cloth' to the public. The leading spirit of the firm was the same Wynne Ellis with whom Macintosh had had fruitless negotiations in 1824 when looking for financial backing. The cloth was made exactly by the Macintosh-Hancock method — by whom will probably always remain unknown. Putting two and two together, Macintosh and Hancock came to the conclusion that a leakage connected with the masticator must have occurred about 1832.

The people behind making and selling the cloth of the mythical Fanshawe who never materialised must have come to the conclusion that the method of manufacture as carried out in Manchester had, since Hancock's closer association with Macintosh, been based on Hancock's

What makes the secretary smile?...

Finding a way of making a sizeable addition to profits—and without risk—is guaranteed to raise managerial morale. This particular company uses industrial solvents in a big way—expensive solvents that used to go to waste after they had done their job. Now, with a Sutcliffe Speakman recovery unit, they are trapped and brought back for re-use. Savings are substantial—sufficient to pay the secretary's salary from now to Doomsday. But solvent recovery is not merely a matter for the bulk user. Small-scale recovery with smaller capacity plant can be, comparatively, just as profitable. Tell us how much solvent you use and we will tell you what recovery can do for you. You'll probably be surprised how much you will save and how soon you will start to save it.

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secret processes and was no longer covered by Macintosh's patent of 1823. Had this interpretation of the legal position been proved correct, this state of affairs would have given the people who—owing to the leakage—had obtained possession of the process involved and had the technical and financial resources to imitate them. A completely free hand to go ahead with their making and marketing of the waterproof materials. For Macintosh and Hancock the situation was definitely serious.

Action for Infringement and Petition for Renewal

The Macintosh - Hancock group had a clear moral case, but they were by no means so certain whether their legal case was quite so watertight as all that. They were not anxious to disclose all their manufacturing secrets to the world in a law court, and the effect of any such revelations on the chances of the 1823 patent to be renewed had to be considered. This patent was due to expire in June 1837. In 1835 the Macintosh firm managed to obtain an injunction *(ex parte)* ' to restrain Everington and Ellis from making, using, and selling certain articles manufactured according to a patent some years ago granted to the plaintiff,' *i.e.* Macintosh. On an application by Everington and Ellis, the Vice-Chancellor dissolved this injunction in December 1835 leaving the parties to try the validity of the patent at common law. This was resented at the time by the Macintosh-Hancock group and came to them as a surprise.

This trial was the ' patent Caoutchouc case ' of February 1836 in which the plaintiffs were Macintosh suing Everington and Ellis, the defendants for infringement of the 1823 patent. While the law was taking its course in 1835 and 1836, concerning this infringement, parallel with these developments went the petition of the Macintosh group for the extension of the 1823 patent. They suffered a setback, as they had suffered a setback in the Vice-Chancellor's Court in December 1835. In January 1836, much to the disappointment of the Macintosh group, the petition was held over to 1837. No wonder they felt the outcome of the case of February 1836 was of considerable importance to their future.

Joseph Clinton Robertson—Hancock's Ally

In connexion with the reporting of the trial it should be emphasized that Hancock had close relations with the ' Mechanics' Magazine.' This was a popular journal devoted to science and invention which was to run for many years during the century. In 1823 it had been founded by a man of letters and partner of a firm of patent agents in Fleet Street, Joseph Clinton Robertson. He had edited the ' Mechanics ' Magazine ' from its beginning and wrote a great deal of it himself. Robertson was to give evidence before a House of Commons Committee on patent law reform in 1849. He is described as a man of considerable ability, after collaborating with Dr George Birkbeck in founding the London Mechanics' Institution, he fell out with Birkbeck and became a formidable opponent. Robertson whose powers of invective were of no mean order had been impressed by Hancock. He had called him ' the father of this important and wonderfully increasing branch of the Arts.'[8]

It is owing to this close connection of Robertson with Hancock that the report of the trial in the ' Mechanics' Magazine ' is so full. In addition, Robertson made no bones about his firm conviction that after Macintosh and Hancock had been left to struggle with the unmanageable substance, caoutchouc, they should be left undisturbed when at last the profits were coming in after the first twelve lean years. But Robertson went further than that. However detailed the report of the ' Mechanics' Magazine ' may appear when compared with other reports available, it is not a full report. The coverage is strongly selective having Hancock's interests in mind. Any details damaging to Hancock and to the Hancock-Macintosh relationship of the past years are carefully omitted. This can only be discovered by comparing the journal's account with the undoctored manuscript account. On the other hand, on one occasion when the journal thought it right to omit evidence concerning technical details, it made it perfectly clear that these omissions had been made deliberately as their publication would be to the disadvantage of the plaintiffs, the Macintosh-Hancock group. Such a manner of reporting would have been intelligible to its readers and there was no need for beating about the bush concerning it. Stimulated by the impending trial, the journal presented a survey of the development of the British rubber industry which quite rightly gave Macintosh and Hancock the credit due to their services. It is interesting to note that the great benefit Hancock had derived from Faraday's advice was menmentioned.[14]

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(To be concluded)

What is claimed to be the world's largest pillow tank, used for storing bulk liquid, has been developed and manufactured by the Aviation Products Division of the Goodyear Tire and Rubber Co., Akron, Ohio, US. With a rated capacity of 50,000 gallons (64ft. long and 24ft. wide), the new tank is made of synthetic-coated nylon. It can be emptied readily and rolled up into a relatively small package, and can be used and stored under a wide range of temperatures and conditions without deterioration. The tank weighs about 1 ton empty

Building Exhibition

REPORT No. 2 ON PLASTICS AND RUBBER IN USE

CONTINUING the report on the high polymers now used in the building industry and displayed at the recent Building Exhibition, it was interesting to examine what has been done by Stewart and Lloyds Plastics Ltd., who like Yorkshire Imperial Metals were originally in the metal tubing field. This company has also installed special equipment at their works to enable the thickness of tube to be monitored during the production of polythene, which is of very great importance when polythene tube is being produced to the British Standard 1972 specification. This tubing is now being supplied in large tubular drums of 60in. o.d. and width 2ft. 8in. weighing approximately 120lb. Usefully, the company supply the tube with a progressive footage mark at 10ft. intervals in order to simplify measuring off without waste.

The US Rubber Co. in association with the North British Rubber Co. Ltd. had a useful display of conveyor belting, one example being made from PVC with cotton reinforcement and designed particularly for use in the mining industry. As a matter of interest the company has in full time operation three Rotocure machines which give some idea of the production being undertaken. Also shown were a number of examples of rubber conveyor belts varying from 3 to 13 ply using between 28 and 42oz. fabric. Norflex, a form of vinyl plastic floor covering for domestic use available in rolls and tiles, can be applied to old and worn floors as well as with concrete surfaces.

In increasing use is polythene film for damp-proof membranes in solid concrete floor construction. British Visqueen Ltd. who specialize in this particular form of building sheet, now supply this in 100yd. rolls of varying widths and thicknesses to suit various requirements. For instance 144in. wide reel 50yd. long costs approximately £3 17s. 6d. which is not expensive and permits the use of this material in many building site applications. The sheeting is tough and stands up to tearing remarkably well providing care is exercised. This thin layer of film is of particular value in protecting brick work against fouling effect (Fig. 1).

Fig. 1. British Visqueen polythene film for brick-work protection

J. S. and E. Falkard Ltd., of Mill Hill, showed a wide range of their Vulcathene fittings which are now widely used in the plumbing industry. Two new items appeared for the first time, firstly a new sink bowl which is a one piece-moulding with an internal size of 18in. by 12in. by 8in. deep, and secondly a combined catchpot recovery trap and diluting receiver with a two gallon capacity.

Commerce Factors (GB) Ltd. showed their insulation material called Poron which is produced by expanding polystyrene approximately 40 times. An interesting feature is that this material weighs approximately 1/10 the weight of cork. There is a considerable application for the use of this material for the insulation of poultry houses, pig houses, cow sheds, barns, farm houses and garages where the retention of heat is important.

Fordham's Pressings Ltd., of Wolverhampton, showed their new Eterna plastic cistern moulded from high density polythene and therefore able to withstand any climatic conditions apart from being virtually unbreakable and very light in weight (only 7lb. complete). This cistern incorporates the Fordham polythene syphon and ball float.

Another form of all moulded plastic cistern was of a design particularly useful for replacing corroded cast iron cisterns. The polythene ball-valve, which is made from high density material under the trade name of Acquasave, was likewise interesting as it is designed on the diaphragm principle and has an outer housing made from polythene. These units have been operated at 100 psi water pressure through over 5 million operations and the valve under test is apparently still functioning satisfactorily which gives some indication of the quality of this particular product. The company also produces an all moulded polythene syphon, available to suit any casing, which being water-lubricated reduces sound noise and of course lime deposit is not likely to take place.

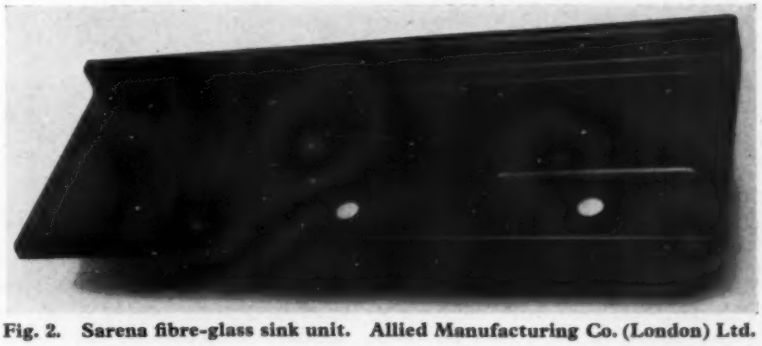

Fig. 2. Sarena fibre-glass sink unit. Allied Manufacturing Co. (London) Ltd.

On the stand of the British Xylonite Group was shown Polyzote, produced by Expanded Plastics Ltd. a subsidiary of the Expanded Rubber Co. Ltd., Division of the Group. This material, an expanded polystyrene, is now being produced in the form of eaves and ridge filler blocks in order

to close the corrugations. These filler blocks are light, non-porous and rot-proof and possess a slight elasticity to allow for variations in the pitch of the roofing. They can be supplied for different sections to fit standard asbestos and aluminium corrugated sheets in lengths of 3ft. and in 2in. widths. The blocks can be nailed to timber rafters using large headed nails. Polyzote granule, also exhibited, is used as a loose filling insulation for placing between ceiling joists in the attic space below roofs and provides a very effective heat sealing in domestic houses. This material, which is also available in inch thicknesses, is suitable for the lining of groft tanks in order to provide heat sealing in cold weather. The insulation efficiency can be judged by the fact that the k value is only 0.24 *i.e.* over 50% better than most tank insulating material.

In the field of polyester reinforced glass fibre structural sheeting, BIP Reinforced Products Ltd. showed Filon, a material constructed mainly of polyester glass fibre, and occasionally nylon, providing a shatter-proof form of roofing. This particular sheeting is made in a continuous process and therefore any length compatible with transport and handling facilities can be made. The material has an 80% light efficiency and produces a form of diffused lighting. The specific gravity is 1.47, other technical data is given below for comparison purposes (Table 1).

To give some idea of the price of the material, a 26in. wide 10ft. long corrugated section in 6oz. material costs 90s. 3d. and a 44in. wide material 10ft. long costs 149s. 7d. in 6oz. material. This material has been subjected to tests in 1958 by the Joint Fire Research Organization and formed the basis for the British Standard specification on fire penetration of roofing materials.

Thermoplastics Ltd. showed ducting in resin bonded glass fibre with Terylene lining and a very interesting construction in the form of a ventilator cowl made from resin bonded glass fibre. Apart from this there was on show a Perspex acrylic kitchen sink unit which is available in various forms and sizes.

A sink unit (Fig. 2) made by the Allied Manufacturing Co. (London) Ltd. from glass fibre 54in. by 18in. gives some idea of the quality of product that can be obtained from these materials. In the same field UAM Plastics Ltd. showed a useful range of glass fibre resin bonded roofing materials.

Lacrinoid Products Ltd. had much of interest on show in plastics including a new form of lampshade under the name Fildenex made for H. W. Field and Son Ltd., of Harold Wood. These lampshades are formed by a blowing process similar to that used in blowing glass bottles to shape and are made from British Resin Products' Rigidex. Other exhibits included large size polythene containers for carrying liquids and other powders, available in 5 and 13 gallon size as well as the standard 2 gallon size.

The new range of handles made from a phenolic compression moulding with Warerite decorative laminate blended into the handle during the moulding process were certainly of very great interest and in fact were seen elsewhere at the Exhibition.

British Insulated Callenders Cables Ltd. displayed a solid embedded floor warming system using PVC sheathed cable.

In the more domestic applications for plastics at the Exhibition the Marley Tile Co. Ltd., of Sevenoaks had a great deal of interest. Perhaps one of the most interesting of all was the space saver doors, which are in effect folding doors made of vinyl plastic working a concertina principle, these doors running on nylon gliding in a steel track. A plastic bumper strip protects the woodwork and a moulded high impact plastic handle is used for latching the door together. A form of expanding door (Fig. 3) was shown by Home Fittings (Great Britain) Ltd. one of the Brockhouse Companies. These expanding walls and doors enable full use to be made of all available space in rooms.

Marley also showed their down pipes and gutterings made from extruded PVC with moulded fittings for joining purposes, these again attracted much interest and will no doubt become standard for domestic houses in due time. The gutters are made in 4 and 5in. size in 6ft. lengths and with 2½in. downpipes in 6, 8 and 10ft. lengths. Shortly 4½in. gutters and 3in. gutter pipes will be available. To give some indication of the price, 10ft. lengths of 2½in. pipe, down pipe are 35s. each and 5ft. lengths of 6in. half round gutter are 17s. 6d. each. The range includes gutter brackets and rafter brackets, as well as sockets, bends, swan necks and branches. Marley rails and extruded vinyl hand rails for covering steel rails were also

Continued on page 814

TABLE 1
SOME PROPERTIES OF FILON

Normal temperatures:	
Tensile strength	=17—18,000 p.s.i.
Flexural strength	=25—26,000 p.s.i.
Young's modulus	$=0.6 \times 10^6$ p.s.i.
Impact strength	=28—30 ft. lb./in. of notch by Izod Test
Thermal expansion	$=11—14 \times 10^{-6}$ in./in./°C.
Thermal conductivity	k=2 B.T.U. in./hr./sq. ft./°F., or approx. 50% of ordinary glass
Thermal transmittance	U=1.0—1.02 B.T.U./in./hr./sq. ft./°F.
Water absorption (24 hr. in water at 25°C.)	=0.4%

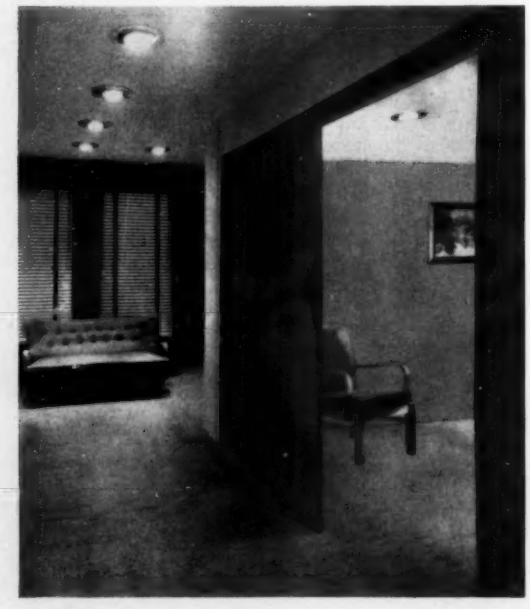

Fig. 3. The Home Fittings expanding doors

the

Vulcan

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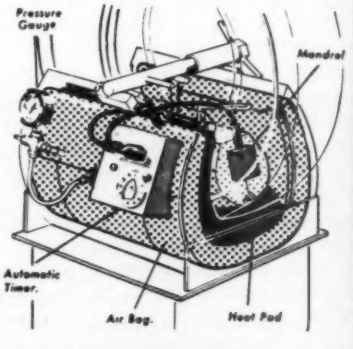
SAVES YOU MONEY

BY ELIMINATING . . .

Greatest advance ever made in tyre repair and vulcanizing units

- No marking plates and spacers
- No conventional type air bags
- Less tyre distortion
- Uses 90% less electricity than conventional moulds
- Heat inside and out
- Cuts curing time in half
- Perfect pressure – stronger repairs
- Automatic heat control and timer
- Less whitewall discoloration
- Fully guaranteed
- Low priced – Vulcan moulds pay for themselves in less than a year on section bag savings alone

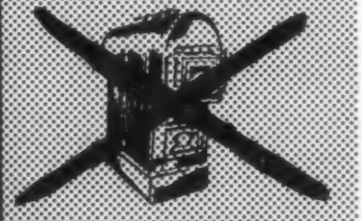
Available in passenger, truck and earthmover models for all tyre sizes



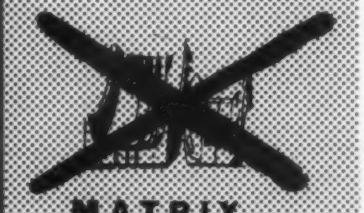
TYPICAL SECTION

MODEL M.P.B.

AIR BAG



BOILERS



MATRIX

GRANTHAM RUBBER MACHINERY CO. LTD.
CONERBY HILL FOOT · GRANTHAM

VIEWS and REVIEWS

Effect on Quality of NR on Finished Goods

E. A. ANTONOVA and M. V. Timofeeva have examined the 'Effect of the Quality of Raw Natural Rubber on the Strength and Durability of the Finished Article' *(Soviet Rubber Technology* No. 2, corresponding to *Kauchuk i Rezina* No. 2, Vol. 18, 1959).

A standard mix consisting of the following was prepared: Raw rubber ... 100; Zinc Oxide ... 5, Sulphur ... 3; MBT ..... 0.7; Stearic acid ... 0.5. The mechanical properties of vulcanizates from 273 bales were determined at room temperature and + 100°C.

It was noted that at + 100°C. the tensile strength for individual bales varied from 50 to 280 kg./cm². and that all bales can be divided into two groups, those giving vulcanizates with high and low heat-stability.

Thus, from a Table it can be seen that while at r.t. all specimens have high tensile strengths, at + 100°C. this property was different for each specimen.

Strength in Cord

'The difference in the quality of raw rubber becomes extremely evident when testing the bond strength of vulcanized rubbers to cord.' The method of test was to determine the number of cycles before a cord was pulled out from standard specimens during repeated compression. The results of this test are disclosed in a Table (4) as follows:

TABLE 4

DYNAMIC BOND STRENGTH OF A VULCANIZED RUBBER PREPARED FROM RAW MATERIAL OF VARYING HEAT-STABILITY TO NYLON-6 CORD IMPREGNATED WITH A CARBON BLACK-LATEX DISPERSION

Test conditions	*Number of cycles to destruction*	
	Raw rubber with high heat stability	*Raw rubber with low heat stability*
Normal t	53,000	31,750
At + 70°C.	108,750	22,500
After ageing in an inert medium at + 130°C. for 24 hours	202,000	94,500

It will be seen that vulcanizates with greater heat-stability have longer life before bond failure at both room and elevated temperatures as well as after heat ageing.

'The quality of raw NR therefore has a considerable effect on the bond strength of vulcanizates prepared from it.' It is stated in the paper that the accuracy of this statement has been confirmed by bench tests of tyres, tyres made from rubber of varying heat-stability and tested for tread separation.

The comparative life (in bench tests) of tyres made from raw rubbers giving various heat-stability reactions was as follows:

Rubber	*Life of tyres %*	*Destruction*
With high heat stability	100	Separation of rubber from the cord
With low heat stability	30	do.

Conclusions

I have not been able to follow the authors in all their work, but will give extracts from their conclusions of an exceedingly interesting piece of work. I do not seem to have come across work on heat-stability previously.

1. Rubbers characterized by poor heat-stability when vulcanized give low dynamic bond strength of vulcanizates, but other physico-mechanical properties are little affected.

2. The higher dynamic bond strength of vulcanizates of NR with high heat-stability can apparently be explained by the considerable strength of the boundary film of vulcanized rubber. It is also possible that rubber with high heat-stability has greater adhesive properties.

3. Determination of variation in heat stability in vulcanized rubber as time of cure is increased can be recommended as a means of evaluating the quality of NR.

Estimating of Cure of Latex Films by Swelling

R. M. Panich, N. M. Fodiman and S. S. Voyutski have estimated the 'Degree of Vulcanization of Latex Films by Their Swelling.' *(Soviet Rubber Technology*: translation of the Article from *Kuchuk i Rezina*—as above—, p. 15, February 1959. Translation prepared by RABRM under the auspices of DSIR Translation Unit).

Method

The method was as follows:

The degree of swelling was determined gravimetrically, and benzene was the swelling liquid. A square piece of film 0.4-0.6mm. thick and 3 sq. cm. in area was immersed at 20°-22°C. in 25cc. benzene for a certain time. The specimen was then removed, carefully wiped with filter paper and weighed, after which it was once again immersed in the benzene. At the end of the experiment the specimen was removed from the vessel and dried to constant weight. The degree of swelling Q was calculated as a percentage of weight.

To determine the time of maximum swelling, experiments were made to study the time-dependence of swelling of latex films. With this end in view experiments were carried out using various accelerators. In all cases swelling reached its limiting value Qmax. after 6 hours.

In addition to the swelling value, the mean molecular weight of chain segments between adjacent cross-links of the molecular weight was determined *(omitted here)* by the method of Flory and Rehner.

Experiments were carried out with films of NR latex vulcanized using sodium diethyldithiocarbamate (1) and

(1) The mean molecular weight of adjacent cross-links of the molecular network of the vulcanizate.

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

dimethylamine dimethyldithiocarbamate (K-45) as ultra accelerator, and the effect of the amount of ultra-accelerator on Qmax., Mc[1] and the tensile strength of films. There were also experiments with (1) and (K-45) on the effect of duration of vulcanization, and experiments with the same ultras at different temperatures.

In conclusion the authors say: 'Determining the degree of vulcanization of latex films by their swelling may provide useful information in examining the factors that determine the strength of films prepared from vulcanized latices.'*

As the first person to have examined vulcanized latices, it may be interesting to enquire as to the examination—*for purely works control*—of films by the old strength or Modulus method compared with the swelling method.

The old method had the disadvantage of *drying*. This may seem a simple matter but gave rise to a number of difficulties. In the swelling method this difficulty should be minimized. There is nothing in the authors paper which bears directly on this subject. As the swelling liquid is benzene one must assume that the latex film was comparatively, or completely, dry. Qmax. is stated to be in all cases at a maximum after 6 hours, but no figures are given for Modulus.

Now with the old method (strength or Modulus), by and large, the results are on much the same lines. There is no clear line of demarcation, as with 'dry' rubber. I do not want to be didactic on this point, but assume that after two treatments with benzene one can assume dryness, which is difficult with the old method. I can foresee that the new method has advantages, but would like to reserve judgment for a little while, and to have trials made at *lower* cures so as to get clear cut limits. Meanwhile I would like to thank Messrs Panich and his colleagues for their paper.

Elastomers

I am indebted to *Chemistry and Industry* (No. 48; November 28 1959, pp. 1498-1504) for a paper on 'The Present State of Our Knowledge in the Field of Elastomers' delivered at the meeting of the Overseas Section of the Society of Chemical Industry in Frankfurt on Main, on June 11 1959 by Professor P. Baumann, of the Chemische Werke Hüls.

Whilst this remarkably interesting paper covers some seven pages of our Contemporary I am, unfortunately, for want of space, restricted to some excerpts from an outstanding article, of special interest here.

Definitions

I will pass over all except the first of Professor Baumann's definitions—quoted from Billmeyer's 'Text-book of Polymer Chemistry' which is: '(1) They must stretch rapidly and considerably under tension reaching high elongations from at least twice to several times their original length with little loss of energy as heat.' to J. C. Swallow's diagram (Fig. 1) which classifies the high polymers into amorphous, glass-like, crystalline, fibre-forming or rubber-like materials, depending on the regularity of the molecular structure, the rate of individual chain stiffness and increasing stiffening point. The rubber-like products or elastomers, are distinguished by a low stiffness of the individual chains, which are flexible, and by a relatively low softening point, to *the author's view* that 'The process by which the latex-bearing plants produce the natural rubber is not fully known, but they surely do not polymerize isoprene.'

Cis-1,4-Polyisoprene

Regarding the 'synthetic natural' Professor Baumann says 'In recent years, some of the large US synthetic rubber manufacturers announced plans to start production of the *cis*-1,4-polyisoprene on a commercial scale.

'The isoprene is polymerized in solution either by the old alkali metal process, using finely divided lithium as catalyst, or by organo-metallic ionic polymerization with Ziegler catalysts, consisting of an aluminium alkyl with a transition element such as titanium. The polymer has the same properties as first grade natural rubber . . .

'As natural rubber takes several years from planting to tapping, synthetic natural rubber could compensate for this shortcoming in a period of greatly expanding production of rubber goods, and it also will, no doubt, assist in stabilizing the price fluctuations of natural rubber.'

Polybutadiene

Of synthetic Polybutadiene the author, after some remarks on production, says: 'The product approaches properties similar to NR with an increasing *cis*-1,4 portion of the polymer. The tensile properties are lower than those of NR, yet hysteresis and elasticity qualities are excellent and oxidation resistance is good. The product can replace NR to a large extent and therefore rival as *cis*-1,4-polyisoprene in future importance. This is underlined by the enormous production capacity of 1,3 butadiene in future importance. For this reason the plant for *cis*-1,4-polybutadiene already in operation by Phillips Petroleum Co. at Borger, Texas, will be succeeded by a plant of the Firestone Tire and Rubber Co. at Orange, Texas.'

Other Synthetics

Professor Baumann, under 'Properties of Various Elastomers' deals with Styrene-Butadiene Copolymers, Butyl, Ethylene-Propylene Copolymer, Polychloroprene Rubber, Nitrile Rubber, Polysulphide Rubbers, Acrylic Rubbers, Hypalon, Fluorine Rubber, Silicone Rubber and Diisocyanate Rubbers, as well as those specially referred to as being of special interest here. He then (*inter alia*) pays attention to Structure Analysis, Isomerism, Ratios of Monomers in Copolymers and Molecular weight distribution, and applies the various methods known today to Buna Hüls 150, a butadiene-styrene of the cold rubber type produced at present at Bunawerke at Marl. Of the results of this Analysis the details will be read with interest by those specializing in this field; unfortunately they cannot be reproduced here.

Professor Baumann under 'Future Developments' in a brief review, commences by saying: 'The production of elastomers has already reached a very large volume. Elastomers are the key to modern transportation. . . .' A masterly review.

PHILIP SCHIDROWITZ

* The M. V. Lomonsov Institute of Fine Chemical Technology, Moscow.

Questions Corner—96

(Second Series)

403. What are the advantages of polystyrene for packaging?

404. What are the essential ingredients for the production of polyester premixes?

405. What effect has mould temperature on the behaviour of thermoplastics during injection moulding?

406. What factors contribute to the photochemical degradation of automobile cellulose lacquers?

(Answers next week)

Answers to Questions Corner—95

399. Almost any conventional compression moulding press may be used for moulding polyester premixes provided it is capable of rapid closing. Pre-gelling may occur if the time between loading the mould and the application of the full pressure exceeds about 8 seconds. Pressures required range from 500 psi to 2,000 psi on the projected area of the mould.

Polyester premix compounds can also be moulded by transfer moulding methods but there is the disadvantage that the flow of the material through the gate results in alignment of the fibres and produces a disproportionate strength in one direction. This must be considered when designing a mould.

Premix compounds are quite abrasive in character and the moulds should be made of hardened steel, highly polished and preferably chromium plated.

The type of mould depends on the product required but may be of semi-positive or positive type. Generally, the former are better since products having the most uniform density and minimum shrinkage require the material to be kept under positive pressure all the time.

In designing a mould the following factors should be borne in mind: 1. Square corners should be avoided if possible. 2. Moulded-in holes should be avoided and it is best to drill these after moulding. 3. Undercuts should be avoided. 4. Sides should be tapered to provide easy removal.

400. There are basically two types of lining that can be considered for the protective lining of containers, viz., the loose and bonded-on type.

Polythene film is used for loose liners in metal containers. It is not expensive and resists the action of a wide variety of chemicals. It is also excellent for foodstuffs.

One piece moulded tanks and containers can also be used as such, and also as corrosion resistant liners for metal or plywood drums.

Kel-F extruded film also finds an outlet for liners and because of the resistance of the fluorocarbons to mineral acids, alkalis and corrosive fluids of many kinds, its application is unlimited. The initial cost is possibly higher than that of other materials but their light weight and unbreakability result in a cost advantage both in service life and transport charges.

Rigid PVC is also widely used in the form of sheet or fabricated corrosion resistant tank liners. Plasticized PVC is also used and both types are acid and alkali resistant. Service temperature is a maximum of 70°C. The hot-gas welding technique is used to produce joints virtually as strong as the material itself.

Glass fibre reinforced plastics are being increasingly used for fabricating tanks and linings. They are especially useful in electroplating applications, and a big advantage is that it will not cold flow or soften in service.

401. The development of cold curing epoxy based adhesives has been developed for a number of reasons.

Many plastics cannot be bonded to other materials, or even to themselves, by heat welding or sealing, but epoxy based adhesives have the ability of joining, with good bond strength, dissimilar materials. Cold curing adhesives also avoid the necessity of using high temperatures.

Sometimes their ability in providing a thermal insulating, or electrical, insulating layer between the bonded surfaces is also an advantage.

The chemical similarity of this type of adhesive and plastics also makes it possible to formulate adhesives which closely parallel the properties of the materials to be joined in respect of flexibility, toughness, coefficient of expansion, solvent and chemical resistance.

The use of cold curing epoxy based adhesives also contributes to a reduction in production costs whether of labour, weight or processing time.

402. In injection moulding, the size and shape of the granules are an important factor. If the granules are too large the air trapped between them is likely to be a problem. If, alternatively, the granules are too small they will melt very quickly along the cylinder wall and become compact with trapped air within the mass. This air will be carried forward into the mould and give rise to air bubbles. Small granules are, however, better for colour blending.

The shape of the granules is directly related to the flowability. Bulk factor and uniform shape and size are important. Particles with a wide distribution of size may cause loss of pressure.

Lubrication of the particles reduces the pressure loss through the machine and allows the particles to compact easily, eliminates frictional heat and gives faster plunger travel. Undue lubrication must be avoided as this may cause haze or streakiness in the finished moulding.

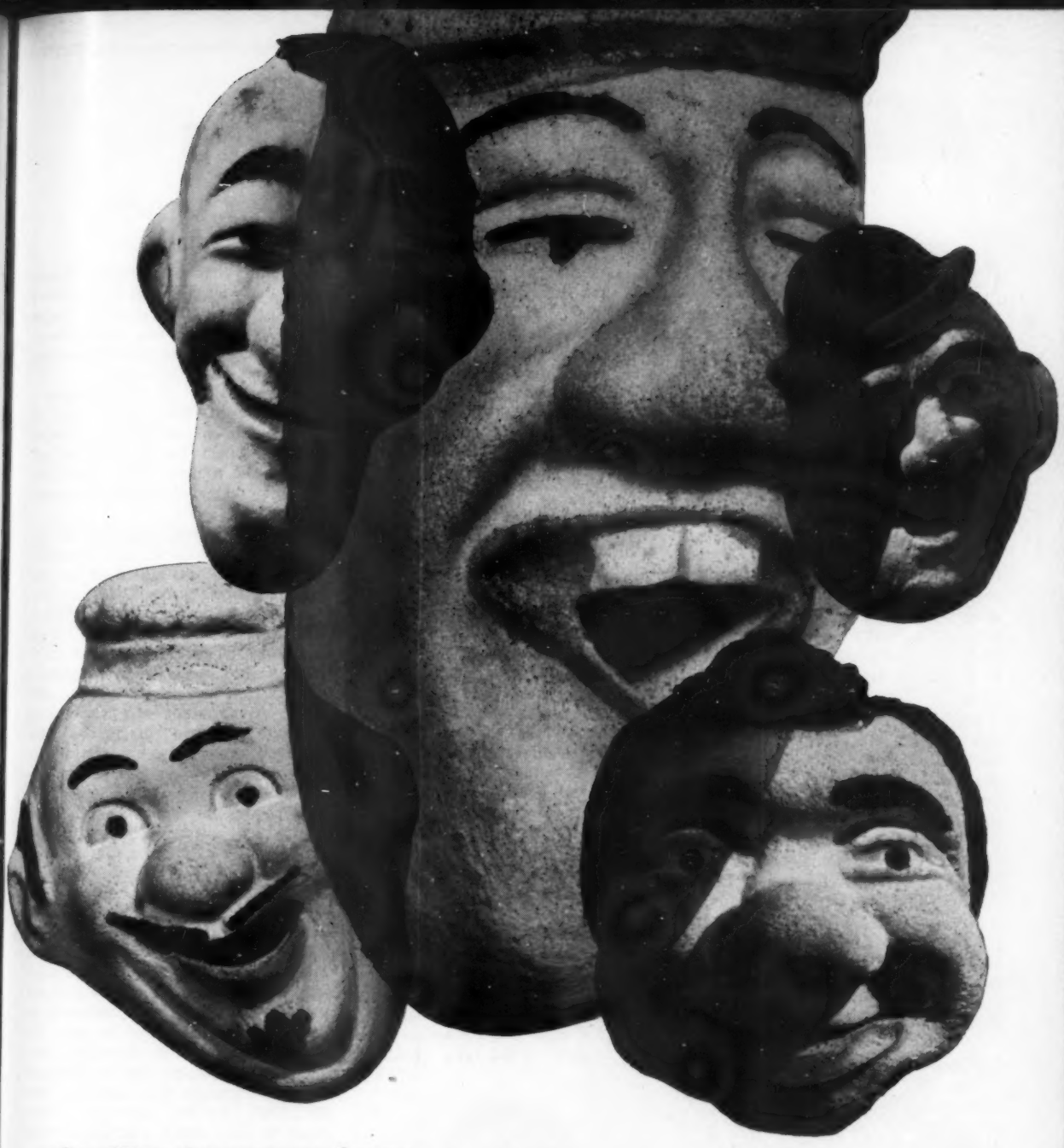
(More questions next week)

Plastics Encyclopaedia

The Encyclopaedia issue for 1960 has recently been published by 'Modern Plastics.' Once again it is a truly remarkable work not only for its size (it weighs over 7lb. although this year's edition is in soft covers) but for the tremendous range of subject matter covered—the index, for example, occupies ten pages and ranges from ABS polymers through to Zein.

Included are articles on the newer resins, such as acetals, polycarbonates and polypropylenes, and on older materials. There is an enlarged section on plastics foams, while in other sections dealing with chemicals, film and sheet, reinforcements and laminates, articles appear on such topics as ultra violet light recorders, the use of sisal as reinforcement, centrifugal casting, filament winding and spray-up moulding. The engineering and methods section, extensively revised, pays particular attention to newer materials and includes processing data. The useful plastics properties charts have been brought up to date and there is also a 64-page technical data section. Other sections in the 1,241 pages of this impressive and valuable volume include fillers and reinforcements, fabricating and finishing and machinery and equipment.

'"Shear strength"— reminds me of my weight-lifting friend'



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MEN and MATTERS

A Review of People and Events

by George A. Greenwood

ONE of the most interesting publications I have seen for many a day is this week's chemicals survey, issued as a special supplement on Monday to *The Financial Times*. There are about 30 contributions in all, comprised within round about 60 pages but three of them are of special concern to the rubber and plastics industries. In the first place Sir William Garrett, chairman of the Association of British Chemical Manufacturers, who needs no further introduction from me, writes about the industry's key role in the economy and points out usefully that the chemical industry, as so many of us already know, has now to be regarded more as a combination of industries, where the end product of one branch is frequently the raw material of another.

In parentheses, I may add here that this is a point which has been brought home forcibly to all branches of the British chemical industry in the long protracted negotiations about raw materials and secondary materials and places of origin, in the formation of the European Common Market and the Free Trade Area of the Little Seven. The Association over which Sir William has the honour to preside has itself been made well aware of these problems and difficulties, but it is also interesting to note that in his view it is in Western Europe that the greatest export potential lies.

For the General Reader

The two contributions specifically dealing with our side of the industries are by Mr K. D. Burridge of the International Synthetic Rubber Co. Ltd., who writes on 'Variety in Synthetic Rubbers,' and Mr E. G. Williams, managing director of I.C.I. Plastics Division, whose article is specifically upon 'Petrochemicals and Plastics.' The great merit, if I may say so, of these articles is that in not more than a semi-technical way they get over to the general reader the most important and salient facts about the industries with which he is, generally speaking, only faintly familiar. For example, Mr Burridge, starting from the point that in the main there is still only one basic type of natural rubber, goes on to survey all the synthetic rubbers, tells how they are produced, and describes their type and their chemical origins, as well as their uses, and the new techniques which have been developed. Mr Williams, for his part, points out that 'the rapid and simultaneous growth of petrochemicals and plastics has been perhaps the most spectacular and significant development of the British chemical industry in the post-war years.' He goes on to give chapter and verse to prove it and particularly points out how polythene, with its considerable lead in sales values, continues to go from strength to strength, concluding that petrochemicals as the main raw materials in plastics production have come to stay. He concludes also that the swing away from coal will go steadily further and further.

The conclusion I reach is that it would be a very good thing for both industries if these important and authoritative contributions could have an even wider, and perhaps more permanent, circulation.

Rubber Regenerating Jubilee

In late August 1909, Mr Raymond Beach Price, founder in 1901 of the Rubber Regenerating Co. of Illinois, walked into a Manchester accountant's office to discuss the formation of a new company in the UK. Now, 50 years later, the Rubber Regenerating Co. Ltd., Manchester, is one of the world's largest reclaimers. Some conception of the work done at the present time is perhaps gained by appreciating that the emerging strands of one day's output from the strainers would together make a single length of about 35,000 miles, and a total area of sheets of fine finished reclaim would cover over 250 acres.

R. B. PRICE

The full story of the company's progress from the early days is embodied in an excellently produced brochure which has been produced to mark the jubilee. Well illustrated with a liberal use of colour, it presents an absorbing story.

The first increase in size of the original plant came in 1911 when an acre of ground was added to the site beside the Bridgewater Canal. Steady progress was made until in 1920 a complete new factory was built occupying six acres. The year 1929 saw a marked change in the company's working methods; most of the old steam driven plant was superseded by more modern machinery and wheelbarrows were replaced by conveyors.

In 1935, the well-known BP 453,702 process was introduced which greatly improved productivity and quality and constituted a marked step in the technology of reclaiming. New chemical and physical laboratories were installed in 1939, and, the booklet states, production was now 40 times that of 1910.

Severe bombing was experienced in 1940 but the company recovered within six months and continued to operate fully throughout the war. In 1945 a further large extension was made to its premises and a widescale change to modern plant was put into operation; further advances were made in 1953 when a series of high pressure autoclaves, distillation plant, extraction plant etc. was installed. Extension has continued steadily until the present day and plant is being built to increase reclaim output by 20%, a high target, but one which, on its past record, Rubber Regenerating should have no difficulty in attaining and exceeding.

North British Rubber

I understand that an official visit was paid to the Castle Mills of the North British Rubber Co. Ltd., Edinburgh, on Tuesday, by Lord Craigton, Minister of State, Scottish Office, Lord Provost Sir Ian A. Johnson-Gilbert, and Sir John Anderson, Secretary of the Scottish

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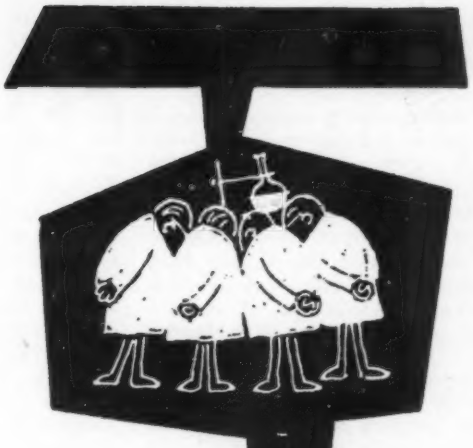

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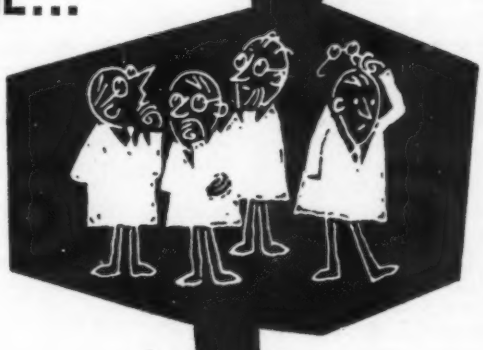

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Home Department. They made a tour of the mills to see work on the company's £3,000,000 modernization and expansion programme.

The programme, which is nearing completion, includes doubling of the capacity of the tyre plant, the erection of a major new hose plant, modernization of remaining facilities and the erection of a new central steam plant.

The new hose factory, the most modern of its kind in Europe, involved the demolition of about a third of the Castle Mills factory area. On the site has been built a single-storey building of about 100,000 sq. ft. for the manufacture of special types of advanced hose for the oil, aircraft, motor and hydraulic equipment industries.

The I.C.I. Changes

We are getting near the time when the more important changes planned in the control and management of I.C.I. will take effect. As already announced Mr Eric A. Bingen, one of the two overseas directors since 1951, has already been elected a deputy chairman; Mr Leslie H. Williams, until recently a member of the main board responsible for dyestuffs and pharmaceuticals, is to become a deputy chairman as from March 1 next; Sir Walter Worboys, commercial director, has retired after 34 years' service, and on March 1 also Mr Stanley Paul Chambers takes over from Sir Alexander Fleck as I.C.I. chairman. With Sir Alexander's departure, it has been pointed out to me, an altogether new managerial phase will be entered, for then, of all those who were directors at the company's inception at the end of 1926, not one will be left on the board.

Mr Chambers, indeed, who went to I.C.I. after a notable career in the Inland Revenue Department, is a comparatively new boy, for he has been with I.C.I. only about 12 years. He is a young-looking 55, and if it is a fact that he can be stern on occasions, it is also true that he can be genial and that he has a sense of humour. Since the announcement that he was to succeed Sir Alexander, Mr Chambers has been visiting centres of I.C.I. activity overseas to meet his on-the-spot directors there. Not long ago he flew on a ten-day visit to South Africa.

The Earl of Verulam

The Plastics Institute will have an unusual and interesting guest and lecturer when the Earl of Verulam delivers its 11th Annual Lecture on 'The Brink of the Unknown' at Cardiff in the spring. Lord Verulam is the fifth earl of his line, but he is also the 12th baronet, the first holder of the title being one of the earliest men to be so honoured when this then new order was created after the Restoration, the third centenary of which we shall be celebrating next May.

The Earl of Verulam, a qualified engineer, is one of the comparatively few members of the ancient lines who are now in industry and commerce up to the hilt. For example, he is chairman of Sternol Ltd., Sterns Ltd., the Enfield Rolling Mills Ltd., a part-time member of the North Thames Gas Board and so on. His younger brother and heir presumptive, the Hon. John Grimston, M.P., is managing director of the Enfield Mills and chairman or director of about half-a-dozen other companies.

Air Marshal for the Board

A newcomer—that is as far as I am aware—to the rubber growing industry is Marshal of the Royal Air Force Sir William Dickson, who has been appointed a director of Port Dickson—Lukut (FMS) Rubber Estates. Although it is a new appointment for Sir William it is probably a natural one, since his family have already interests in Malaya. Lieut.-Col. D. G. Dickson, of Dickson, Anderson and Co. Ltd., is chairman of Kuala Pilah Estates, and of Telok (FMS) Rubber Co. Ltd.

The Marshal, a much honoured man, as a Knight Grand Cross of the Order of the Bath and a Knight Commander of the Order of the British Empire, among other things, was appointed Chief of the Air Staff in 1953. His retirement has enabled him at the age of 61 to enter pastures new.

There are also changes to begin operating from the end of the year in the P. B. Cow group. Mr Alexander S. Baird, and Mr Charles C. Hawkins (who has for some years had associations with it through Sorbo Ltd.), are to become joint managing directors. Mr William J. Garner, present managing director of the group, and chairman of Sorbo Ltd. for more than 25 years, has now reached retiring age, and is to relinquish his directorships, but he will continue to act in an advisory capacity. A further retirement will be that of Mr Charles Hatley, a well-known and popular figure in the industry.

One other change which will interest many of our friends in rubber is that Mr R. M. Bateman, M.A., A.C.I.S., is giving up the chairmanship of Turners Asbestos Cement Co. and is leaving the board. This, however, is only an internal changeover. Mr Bateman is in future to devote his time wholly to the functions of Turner and Newall Ltd. as deputy chairman, bringing him into touch again with many old friends in rubber.

A Dunlop Retirement

After 40 years' service with the Dunlop Company, Mr T. W. Greaves, safety officer at Fort Dunlop, has, at the age of 65, retired. He went to the company after war service with the Royal Field Artillery, and worked in various departments until he was transferred to the safety section. Ten years ago he was appointed safety officer. In that year there were 219 lost time accidents. By 1958, this figure had been cut to 82.

It is incidental, but very apposite to the story, that Mr Greaves has had personal experience of the need for industrial safety, in the promotion of which the rubber industry plays such an important part. In 1924 his left foot was badly injured at work—an accident which would not have happened if safety shoes had been available then! 'Bill' Greaves, as he is so well known, is a founder-member of the Birmingham Industrial Safety Group and played a leading part in the establishment of its training centre for apprentices. Four years ago he was made a member of the Order of the British Empire for his services to industry.

Young People's Lecture

The Plastic Institute's 6th Lecture for Young People will be given in London on Friday January 1 1960, by N. A. de Bruyne, managing director, CIBA (ARL) Ltd., and will be called 'Sticky Plastics.' It will be delivered in the Lecture Theatre of the Institution of Electrical Engineers, Savoy Place, London, W.C.2, at 2.30 p.m., and will be illustrated by slides and supported by demonstrations. The chair will be taken by H. F. Wilson, president of the Plastics Institute.

Combex Ltd.

The showrooms and head office of Combex Ltd., formerly at Ganton House, Ganton Street, London, W.1, have been moved to Heathcoat House, 20 Saville Row, London, W.1. Mr Max Reich, managing director of the company is operating from this new office. The Combex warehouse, general sales and accounts offices have also been moved—to Brookfields, Lincoln Road, Werrington, Peterborough, Northants—and are in the charge of Mr C. W. Curtis, director.

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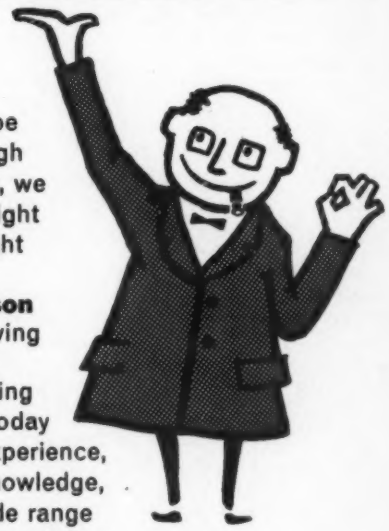

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The Origin of Golf

NOT RUBBER OR PLASTICS

SOME weeks ago there was a complaint from an American reader of *RJIP* that golfing matters were being neglected. We wonder whether the few paragraphs below will interest him and other golfing enthusiasts and also wonder how many of us are aware of the origin of the Royal and Ancient Game!

The quotation is taken from page 200 of 'The Gulf Stream Story' by Hans Leip. The book was originally published in Germany under the title 'Der Grosse Fluss Im Meer,' and has been translated from the German by H. A. Piehler and K. Kirkness, and published by Jarrolds of London.

'Even before the discovery of America, before anything was known of the Indios' ball games and rubber balls, the Scottish fisher lads were playing golf. They appear to have used as balls the strange "sea kidneys," which from time immemorial had been washed up on the shores—greetings from the unknown. Occasionally there came a well-read merchant from the town, or perhaps the local clergyman had heard tell of the Spice Islands in the Far East. Always there had been rumours of the same fairylands beyond the western horizon, if only one ventured far enough out. Some bold spirits had already reached them by travelling overland to the east. Such for example were the Molucca Islands, whence came the "sea kidneys" or Molucca beans.

'In fact the Molucca beans came from the coasts of Mexico or the Antilles. They are the seeds of *Entada scandens*, a huge plant of the pea family, with pods a yard long. The Gulf Stream washes all sorts of tropical seeds to the shores of Europe, but Molucca beans were the most conspicuous and best known. Even after Sir Hans Sloane (whose collections became the nucleus of the British Museum) had returned from his travels to Madeira and Barbados with proof of their true place of origin, people continued to call them by the old name. Sloane lived as long as his countryman Bernard Shaw, but he never guessed the reason for the Entada's long voyage.

'Among the driftwood the Scottish fisher-lads found also the handy clubs with which the sea balls or "gouf" beans, or whatever they called them at first, could be hit into the air. Then some ingenious fellow started hollowing out the balls and filling them with feathers, of which there are plenty lying about on any beach, to make them fly farther than the others. When James VI came to the throne of England, his fellow countrymen brought the game with them to London. The fact that golf was born on the sea beach is shown by the fact that even inland golf-courses are still known as "links," a term originally applied to a sandy tract near the seashore.'—E. P. B. E.

NAVAL REFUELLING HOSE

An application for hose which requires exceptional strength and durability is for refuelling ships at sea in the Royal Navy. The Goodyear Tyre and Rubber Co. Ltd., in co-operation with the Admiralty, has for many years conducted research into the problems involved and a number of Goodyear designs have been operated successfully.

The conventional method of refuelling at sea has been for the tanker and the warship to steam parallel to each other and for a hose to be suspended between the two. The difficulty of this operation is that both ships must maintain an exact distance apart—a tall order in bad weather conditions.

Goodyear have now developed a Terylene reinforced hose which simplifies the operation. By nature of its much greater strength it can be trailed in the water and picked up astern by the receiving ship as shown in the illustration. To work with the hose, of 6in. bore, special light alloy couplings have been developed by the company, vulcanized into the hose during manufacture. Two types of hose are available, compounded for use with furnace oil and the high octane fuels for carrier-borne aircraft.

A Royal Naval destroyer picking up a Goodyear refuelling hose

BUILDING EXHIBITION

Continued from page 804

shown. This handrail, which is being used increasingly in the building industry particularly in modern office blocks, flats, etc., is fitted on without adhesives due to the design of the extrusion section. Also shown was a wide range of flooring tiles of different grades and qualities to suit various applications, among them Marleyflor which is a 48in. wide continuous vinyl flooring and due to its extreme flexibility is very easy to lay.

Other plastic gutters and rain water pipes were by G. H. Osborn Building Products Ltd., of London. These were of high impact PVC and from a brief inspection seemed of good quality. Of particular interest was the system of clipping the gutters together. The gutter is simply placed under the rear projecting nib of a moulded bracket pressed down onto a sealing strip made of expanded rubber and forced under the front nib. The second gutter is fitted in the same way up against the first thereby giving a very simple and yet efficient form of gutter support. This company makes as well a range of gutters and fittings from polyester glass fibre.

Witco Dinner

The annual dinner and dance of the Witco Chemical Co. Ltd. was held on December 12 at the Anglo-Belgian Club, Belgrave Square, London. Cabled greetings from the chairman of the company in New York were read, announcing at the same time the election of C. C. Hallett, managing director, London, to the main board of directors of the American company, alternating with Mr R. Shacklady, joint managing director.

Ferguson Shiers Ltd., Phoenix Mills, Failsworth, Manchester, will be closed from December 25-28 inclusive. No goods will be received or despatched during this period.

Plantation Commentary

THE NEW PARLIAMENT

by our Malayan Correspondent

THE needs of the rubber industry are well taken care of in the new Parliamentary structure which has now been established in Malaya.

In the Senate, the Upper House in the new legislature, there are three nominated members who have a close interest in the rubber industry, including one who appears to have been nominated directly as a rubber industry representative, though the official announcement did not link the names of the nominated senators with particular interests.

He is Mr J. E. S. Crawford, the general manager of Sungei Siput Plantations who for eight years was the vice-president of the United Planting Association of Malaya. He formerly represented planting interests in the old legislative council. Aged 54, he began rubber planting in 1922 and was a member of the Perak State Council after the war and has been on many planting committees and bodies of a similar nature as part of his public activities.

Dato Sir Clough Thuraisingham, who has been presumably nominated to represent the interests of the Ceylonese community, is also prominent in the rubber world as president of the Malayan Estate Owners' Association. He has recently been campaigning strongly for a Malayan rubber mission (see below).

The third senator with an interest in rubber matters is Mr Choo Kok Leong who is a member of the Rubber Research Board and a former member of the Rubber Producers' Council.

The establishment of the new Parliament marks one of the final stages in the implementation of the Malayan Constitution. The House of Representatives is an all-elected body of 104 members and in the general elections the Alliance won 73 seats and the opposition parties 30 seats, of which 13 went to the somewhat communal Pan Malayan Islamic Party which is certain to give the Alliance stiff opposition in the next five years.

There is still one seat vacant at the time of writing as the election in one constituency was cancelled.

The Senate, with its 38 seats, is on the other hand an entirely nominated body in most respects. Each of the State assemblies send two of their members to the Senate and in addition there are 16 seats nominated by the Paramount Ruler on the advice of the Prime Minister.

Although Parliament has been opened and both Houses have adopted standing orders and selected committees, they will not get down to business in the normal course of events until November when there will be the speech from the throne and later the budget. There will be more than normal interest in this budget for the Alliance can look forward, with its majority, to five years of rule which must include a great deal of development work.

In the nature of things, it seems possible that the new Government will want to get over the worst hurdles early on in its career when considering the new taxation. But the Prime Minister has said that he does not want to introduce new taxes, unless he can help it, which will increase the cost of living.

Japanese Interest

Interest in the purchase of Malayan rubber estates was shown here by the chief rubber department of Kasho Co. Ltd. of Tokyo, Mr K. Hashimoto. The firm imports about 20% of Japan's annual rubber consumption and is keen on acquiring at least one estate here.

Mr Hashimoto said that his firm was interested in purchasing about 2,000 acres which need not necessarily be high-yielding. He pointed out that they had experienced people who could carry out replanting. One stumbling block to the Japanese firm's interest is that prices have been found to be high in Malaya, including the price of old estates.

He said that Japanese investors preferred Malaya, because of the stable political situation here, to Indo-China and Siam, where rubber land could be bought cheaply. In Vietnam and Siam where the rubber land could be supplied quite freely by the government they had found the political situation to be a deterrent. They were not interested in Indonesia where the government had adopted a harsh attitude to foreigners. He plans to report back to his firm on his Malayan inquiries.

Typical, too, of the interest being shown in Malaya by Japanese firms was the announcement by the representative of the Bridgestone Tire Co. Ltd. that they planned to increase their imports of Malayan rubber with the opening of a new plant in Tokyo. At present the firm takes up to 40,000 tons a year of which 80% comes from Malaya. With the new plant the company's production will double. The company has also submitted plans for a tyre factory in Malaya.

Increased Revenue

The higher price for rubber since the middle of the year is likely to have a considerable effect on the deficit in the budget for 1959. The estimates from rubber export duty have already been exceeded. The revenue from the export duty on tin has also been rather better than the somewhat conservative prediction made when the budget was prepared last December.

The Treasury estimated that rubber would be selling at an average of 75 cents a lb. this year but, in fact, it has been $1 a lb. or more for a substantial period. The estimated total revenue from rubber export duty this year was $76 million but this figure was passed in the first seven months of this year. By the end of July actual revenue stood at $89 million.

The higher price for rubber has also activated the anti-inflationary cess fund which begins operating when rubber rises above the $1 mark. Somewhat unpopular in the rubber industry, in that it absorbs money which estates feel they could put to better use replanting or in other ways, it was designed primarily to prevent inflation developing through smallholders spending their new found wealth too quickly. It mops up increasing amounts of money as the price rises about $1 and repays as the price falls below.

Started in 1955, it gathered a fund of $55 million before rubber fell below $1 in February 1956. For a week in August and for a short time at the beginning of 1957 it again came into operation. The price stayed below the ceiling for two years and three months and by the end of last year the fund had paid back all it had gathered except for small amounts due to some estates for various reasons.

Between May and June this year it collected $600,000 and in August began again. There is now well over $1 million in the fund.

There has been considerable interest here in the proposed central co-ordinating advisory committee that has been suggested by the Controller of Rubber Research, Sir Geoffrey Clay. He spoke about it while in the United States and rubber producers are anxious to hear more about it.

It is generally considered to be an effort by Sir Geoffrey to spring clean the entire organization. It is expected that the committee will include the Rubber Research Institute in Malaya, the Natural Rubber Producers' Research Council and possibly the International Rubber Research Board, the International Rubber Development Committee and the Natural Rubber Bureau.

The Controller's office said here that it was felt that the present advisory committee in London was not a co-ordinating committee in the strict sense of the word. The new committee, it was felt, could avoid waste effort by two separate research units carrying out the same kind of work at the same time.

It is expected that one of the main tasks of the co-ordinating committee will be to allot different fields of research to the major units in Malaya

and Britain ensuring no chance of duplication.

Pay Up

The incentive scheme which came into force recently has resulted in many rubber tappers, on good estates and where they are willing to work hard, getting substantially larger amounts of pay. The scheme was specifically designed to help the more skilful and more hard working tappers.

A number of tappers have been reported recently to be earning about $200 a month (close to £25 a month) because of the incentive scheme and because their pay had increased with the increase in the price of rubber. In addition to other allowances, the tapper also gets additional allowances for scrap.

Several estate managers reported that tappers are working harder and with more replanted areas opened up they have better opportunities. The scheme does not, of course, alter the amenities provided by estates in the way of housing and medical services.

Book Review

RUBBER RED BOOK—(*Rubber Age*, New York, pp. 852, 1959, 12th Edition. £5 12s. 6d.)

The new edition of this excellent directory—now published annually—has made a welcome appearance. The original 6 x 9in. format has been discarded and the new size is 8¼in. x 11¼in., with soft covers. Despite a reduction in the number of pages—the previous edition approached 1,500—the volume of material included has been increased considerably and reflects the rapid rate of development of the US rubber industry.

Very full details are presented, under a convenient and straightforward reference system, of: Rubber manufacturing companies in the US, with geographical and alphabetical sections; rubber manufacturers in Canada; machinery and equipment; laboratory and testing equipment; accessories and fittings; rubber chemicals and compounding materials; fabrics and textiles; natural rubber and miscellaneous gums; synthetic rubber; reclaim; scrap rubber and plastics; latex and related materials; miscellaneous products and services; consultants; sales offices; export agents; educational details; trade and technical organizations; technical journals; who's who.

The *Rubber Red Book*, this edition of which has been produced with that same well-known accuracy and attention to detail of its predecessors, would be a useful addition to the bookshelves of all concerns in the rubber and allied industries.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

South African Section IRI

Transvaal Branch

Meetings were well attended throughout the year ending November 25 1959. During the course of the year papers were given on: 'The Maintenance of Electrical Machinery in the Rubber Industry'; 'The Work of the Rubber and Plastics Section of the SABS'; 'Cost Accounting and its place in Industry'; 'Natural Rubber, Synthetic Rubber and Thermoplastics for Electric Cables'; 'Manufacture and Applications of Latex Foam Rubber'; 'Polyster Resins for the Plastics Industry in Surface Coatings'; 'Polyurethanes'; 'Plastics in Packaging Plant and Transportation.'

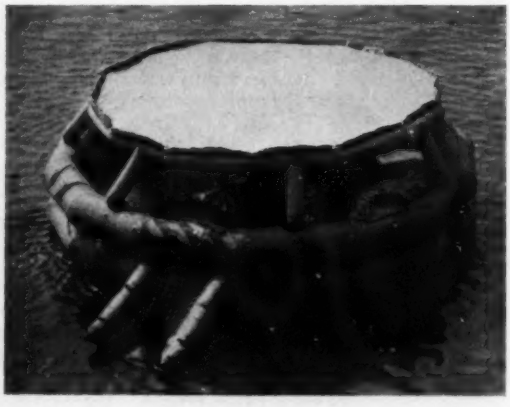
Golf Section

A challenge match between the Plastics Institute and the Transvaal Branch was held on July 25. The Plastics Institute invited the branch to participate in their annual golf tournament held on November 7 1959.

Natal Branch

Papers given at the Natal Branch during 1959 included: 'Work of the Rubber and Plastics Section of the SA Bureau of Standards'; 'A Review of the Manufacture and Uses of Latex Foam Rubber'; 'Insoles—Their Importance in Shoe Production and Modern Trends'; 'New Developments and Applications of Synthetic Rubbers'; "A New Approach to Work Study'; 'Tyre Developments in the Past 25 Years.'

The Distillers Co. Ltd. chemical division announce reductions in prices of their acetate ester solvents. These are as follows, reduction per ton: Ethyl acetate, £8; isopropyl acetate, £5; and butyl acetate, £8.



The Armstrong Whitworth 'Argosy,' which is now doing considerable amounts of flying over the sea on its overseas demonstration tours, is the first British aircraft to be fitted with this revolutionary raft manufactured by the Beaufort Co., of Birkenhead. The raft, which inflates automatically in 17 seconds, can be boarded from all sides simultaneously and will hold 26 people. It is double-sided and appears the same whichever way it falls into the water

CANADIAN RUBBER

Two Canadian rubber footwear manufacturers are joining forces in an effort to strengthen their position against the flood of low-cost imports. Discussions have taken place between The British Rubber Co. Ltd., of Lachine, a division of Mailman Corporation Ltd., and The Miner Rubber Co. Ltd., of Granby, Quebec, on establishing a jointly owned and equally controlled manufacturing organization to produce waterproof footwear under British, Miner and Hood brands. Directors of the new company when formed will be A. Stuart McLean, John W. H. Miner, Edward G. Wellheiser and Noel A. Austin. Beginning early in 1960, a portion of British Rubber footwear requirements will be manufactured at the Granby factory. The two companies will continue their separate identities and will market their own products and brands independently through their separate sales organizations, head offices and warehouses as at present. The Lachine factory of Mailman's British Rubber will continue to manufacture slippers, canvas casuals and moulded footwear, plus certain other products, and a substantial expansion of these operations is in prospect. The Miner Rubber Co. will continue to manufacture mechanical and other products, such as vulcanized industrial work clothing and gloves. They will also continue their operations as custom proofers.

Sir Miles Thomas, chairman of Monsanto Chemicals Ltd., has announced that the company has joined the growing number of firms which do not send out a company Christmas card. Sir Miles said that Monsanto would instead make a donation to charity.

Rubber and Plastics in South Africa

NEWS OF FIRMS AND PRODUCTS

THE first rubber tyre to be made in the Federation of Rhodesia and Nyasaland was produced recently in the Dunlop factory in Bulawayo. It was a large standard type tyre for a commercial vehicle. Since then there has been an increasing flow of tyres from this factory, which has been designed to meet the rising demand for tyres in Central Africa.

Domestic Ware

Plastic and Metal Industries (Pty.), Ltd., Johannesburg, are adding to the range of domestic ware they are manufacturing under the Boilproof trade mark. The company states that not only are its products made to attractive designs but they are guaranteed to give long wear and are competitively priced. The new additions to the range include an oval-shaped bread-basket of filigree design, a two-tone water jug with slide seal spout, a 20cm. strainer with handle, and a twist-on cap pitcher. Among the larger items made are 100% styrene fluted tumblers, claimed to be unbreakable, in a variety of colours, chambers in new design to appeal to children, sink tidies, buckets of up to 2 gallon capacity, some with well fitting lids.

Polystyrene Tiles

The USA Plastic Corporation (Pty.), Ltd., Paarden Eiland, Cape Town, has completed its plans for the production in South Africa of the full range of Polystyrene tiles that have been popular in the US for the last 10 years or so and have also been introduced successfully in a number of other countries. The South African wall tiles will be sold under the Durosheen trade mark and will have a weight of some 6oz. per sq. ft., so that they will be much lighter than any other wall tiles currently available on the local market, with the advantage they can be set on most structurally sound building materials. The local product is available in a choice of 21 colours, with either plain or mottled effect, and they are sold with a useful instruction book to help the householder set them in place himself. It is available in English and Afrikaans.

Dunlop Industrial Products

The Dunlop organization in South Africa has formed a new private company, styled Dunlop Industrial Products, which will take over the activities of British and Union Rubber Manufacturing Co. Ltd., and the Industrial Products Division of Dunlops in South Africa. This development will centralize control and generally improve sales conditions. The old Burmco factory at Lincoln Road, Benoni, will continue to manufacture the wide range of rubber products associated since 1937 with the British and Union Rubber Co. which has been under Dunlop control since 1949. The Dunlop organization in South Africa has been supplying the mining industry, engineering, commerce and other consumers with a wide range of rubber needs, such as conveyor belting, transmission belting, vee belts, all sorts of rubber of South Africa, Ltd., in this enter- corrosive- and acid-resistant rubber coverings for metals, footwear accessories, rubber solutions and adhesives. Other items are added to the range as the need arises.

Vynide and Fibre Cases

Travel-Eze, Ltd., 435 Windemere Road, Durban, are making a new set of vynide and fibre cases in the dimensions to fit the bonnet and rear seat of the Volkswagen cars now assembled in South Africa. This firm has made other travel goods to match other makes of car.

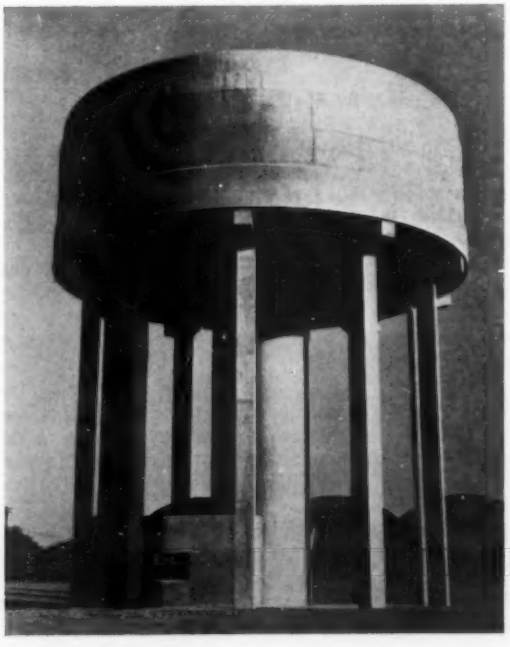
Oil Carbon Black

Oil carbon black for the tyre manufacturing industry is to be manufactured in South Africa by the Phillips Carbon Black Co. (Pty.), Ltd., which is associated with the Industrial Development Corporation of South Africa, Ltd., in this enterprise. The process of the Phillips Petroleum Corporation of America will be used in the South African plant. Details in regard to site have still to be settled, but it has been announced that the annual production will be large enough to meet the demand of the South African rubber industry for oil blacks.

Geigy Reduce Prices

Reductions in the prices of certain alcohols have led to the Geigy Co. Ltd., Middleton, Manchester, announcing price reductions of between £7 and £10 a ton for six of their Reomol range of plasticizers. The alcohols concerned are normal butyl alcohol, iso-decyl alcohol and 2-ethylhexyl alcohol, and the plasticizers affected are Reomols DBP, DiDP, DOP, DOA, DOS and DBS.

Mr D. J. Flunder, general purchasing manager of Dunlop's Materials Supply Division has returned from a three week visit to Singapore, Malaya, India and Pakistan. During his stay in Malaya Mr Flunder visited several of the Dunlop plantations there.



More than 9,000lb. of rubber compound was used by Dunlop to line the new 200,000-gallon water tower recently built by the Southend Water Works Company at Thundersley, Essex. In this area there has been some history of subsidence and it was felt necessary to use the rubber to prevent leakage in case the concrete tower should develop slight cracks. The job of lining the tower, which is 54ft. in diameter and 15ft. deep, was carried out on the site and took a fortnight

Rubber and Plastics News

CONTINENTAL AND FOREIGN DEVELOPMENTS

A NEW field for the application of plastics materials is open in Greenland, where their qualities of solidity, thermal insulation and lightness have rendered them preferable to traditional materials. A sectional igloo in plastics has been manufactured to shelter for a period of some months the members of a French mission and their stores. The igloo has an internal diameter of 650m. and a height of 580m., and is made up of panels of standard type prefabricated in three different types, two of spherical form and one of cylindrical form. Of the sandwich type, these panels are formed by a polyvinyl chloride centre, 50mm. thick, and hardened, stuck between two facings of stratified tissue in glass-fibre polyester, 3mm. thick. All the panels are internally connected by ribs in the same material, which allows of assembly by pins or bolts. The panels so assembled form a shell externally closed by two metallic bands. Water-tightness between the panels is ensured by two profiles in rubber. The floor of the first storey is carried by a metallic framework. The whole construction rests on a circular wooden floor placed on the level snow.

Chinese Research

A railway passenger car which has been manufactured in China during the last twelve months has adopted new techniques, among which is the use of rubber parts for the coupler, which is said to decrease the amount of impact and its effect and to provide a smoother drive for high speed running. Another Chinese development is experimentation with the use of epoxy resin for binding porcelain insulators. A new method of binding has been tried and suitable binders and thermosetting procedures are said to have been found.

Also from China come polythene-insulated radio-frequency coaxial cables. Such cables have already been put into large-scale production.

French Wall-Covering

A wall-covering from France is known as 'Everiglass' and is made up of a sheet of asbestos cement to which is applied by spray gun a series of polyester resins. Of brilliant appearance, this material is particularly suitable for bathroom and kitchen walls, and it can be had in nine colours, and in sheets of 2.50 x 1.20. A handrail or banister in vinyl chloride also comes from France, and is said to be highly resistant to wear and shocks. It can be used as desired, either inside or outside, and is obtainable in 175 different colours. Installation is carried out hot with a special heater and a soldering iron. The longest lengths can be had in a single operation, the joins being absolutely invisible after rubbing down and cleaning. Maintenance is nil, and ordinary chemical agents do not impair the material.

Malaya

Malayan rubber growers are spending more money on research, and from their laboratories are said to be coming rubbers with the properties of leather and plastics, for shoe soles, electrical use, cups and saucers.

German Plastics

In Germany, medicine has been greatly aided by the plastics industry. The latest discovery there is a wound dressing made of powdered carbamide foam. Human and animal tests are said to have shown that the powdered plastic quickens healing, adheres to the skin, but does not irritate. This and a number of other plastics applications to medical techniques, such as bone replacements, sutures, stomach and intestinal tubes, were recently shown at Düsseldorf.

Bridge Suspension

Pads made of neoprene are taking the place of metal support-bearings on the new Tancarville bridge crossing the Seine river above Le Havre. The synthetic rubber pads are to be sandwiched between concave and convex sections of concrete, and will absorb movement in the bridge's abutment. Neoprene pads have been used on other French bridges, but have merely been interposed between girders and piling without being housed between concrete sections. The Tancarville bearings are 2m. wide, 3.6m. long, .95m. high, and can support 10,000 tons.

Motel Unit

An interesting French development is a movable unit for motels, built for two people from a sandwich in which a thickness of cellular polyvinyl is placed between two layers of stratified glass-resin polyester. The polyvinyl chloride is physio-chemically united to the surfaces of the stratified material by a special process which ensures an intimate bond that cannot be obtained by adhesives. There are six elements in the construction of the cabin—a floor element, two pinions, two lateral panels, one of which carries the outer door, and a roofing element. Welding and rivets are used to assemble these elements. The shell rests on a metallic chassis by means of four shock-absorbers. The door is made of two panels of glass-polyester forming a body with cellular partitions, which is itself of reinforced polyester.

Holland

Holland has produced a small impulse-welding apparatus for sealing polythene packaging cones. In three countries of Latin America—Cuba, Haiti and Guatemala—a new fibre derived from the bark of a fast-growing plant resembling hollyhock, is soon to be produced commercially, it is believed. This fibre is claimed to make an excellent substitute for the jute used in making sugar and grain bags; but its interest to the plastics industry lies in its being also a plastics strengthener.

Diaphragm Moulding Machine

Rubber comes into the construction of an efficient, economical, diaphragm moulding machine which makes use of compressed air to press upon a rubber diaphragm directly in contact with green moulding sand to form moulds. The pattern equipment for this machine, which has been developed in China, may be made of plastic materials. From China comes, also, an automobile of light weight with a body of plastic. The plastic is phenol-aldehyde resin reinforced by glass fibres.

Polyester Floors

In France floors with a polyester resin base are being put down directly in the shops by the application of semi-liquid mixtures on cement coverings, with or without the incorporation of a glass fibre reinforcement. The application and polymerization of the different layers of mixtures is carried out in a single day, and the floor can be put into

service the next day. The plastic thermo-hardening floors form a fully homogeneous whole, tinted in the mass. They present, therefore, the advantage of great speed of application and putting into service, and allow great mechanical resistances to be obtained, especially when they are reinforced with glass fibre. They resist most chemical agencies as well as corrosive atmospheres, chemical atmospheres and marine air, being also absolutely passive to bacteriological agencies, so that there is no formation of moss or moulds. They are applicable to exteriors as well as interiors, and the anti-skid surface obtained presents high resistance to abrasion and absolute impermeability. Typical uses are for works, garages, depôts, terraces or balconies, hospital floors, technical institutions, offices, etc.

Plastics in the Fiat 500

Italian automobile makers are using more different kinds of plastics than others. Ten basic types are used in the Fiat 500. Cast urethane rubber is commonly employed, and polypropylene is being tested for moulded carburetters, distributor caps, radiator fans and shock absorbers. In this same field the Germans are using plastics for housing the sharp corners of sun visors, dashboards, and instrument clusters, in vinyl foam padding. Phenolics are in common use for window trims, dashboards and electrical components. Japan also is expecting to make greater use of plastics in car production, particularly for interior trim. Polyvinyl chloride is the most widely used, except where bodies are made from reinforced polyesters. Polythene is being used for brake fluid cylinders and battery trays, fibre-reinforced plastics for seat frames, roof liners and doors.

Nitrile Cable Sheath

From France comes, also, a type of cable sheath which is made of a nitrile rubber, vinyl chloride and stabilizing agents. This is used to cover a cable which includes a number of rigid conductors.

Resin-Rubber Compounds

Some synthetic resin-rubber compounds have approximately the same mechanical properties as carbon black rubber compounds. Usually the best results are achieved by means of a latex phase. In Africa, and particularly in the French territories there, attempts are being made for economic reasons to make resin ingredients from local materials, such as proteides, which are extremely common and have already been employed as ingredients. Tests have already been made with casein and proteides of ground nut, soya, castor oil seed, fish, whale, gelatin, etc. Strength, modulus and hardness are largely akin to those of black-reinforced carbon blacks. Tear strength is rather lower, but nevertheless high. One property of these compounds is low heat build-up under dynamic stress.

Moulding Techniques

A variety of moulding techniques is being employed to manufacture inexpensive tanks of all sizes. Germany makes use of a sinter moulding operation to produce extra-large tanks and bins. It involves comparatively low mould costs, provides a variety of shapes and important production economies.

Enclosed Lifeboat

From Germany comes a radically new lifeboat, completely enclosed, much as a submarine is. It will automatically right itself from any position, while the four hatchways can be hermetically sealed so that the vessel is completely water-tight. The structure comprises a double hull of glass-fibre-reinforced polyester sandwiched with hard polyvinyl chloride foam, and needs virtually no maintenance. Overall length is about 7.8m., capacity 40 or more persons.

Many British readers have felt the need for a comprehensive account of developments and producers of plastics in some competing country. This is now available from the French, at all events, for a French 'Encyclopaedia of Plastic Materials' discusses the latest plastic developments in application, materials and processing techniques, and includes a classified index of French plastics companies. It has 578 pp. and costs Fr.5,950.

Guayule

There is a type of rubber originating in Spain known as Guayule. Attempts have been made to vulcanize the deresinified material, either as the pure rubber or as mixtures reinforced with carbon black. It is stated that these have been extremely encouraging from the industrial point of view.

Creators Ltd., Woking, are using 'Cobex' rigid vinyl manufactured by BX Plastics Ltd., to produce non-corrodible 'L' plates which are lightweight and will not chip or scrape the car body. Impervious to water, tough and resistant to most chemicals, 'Cobex' is ideally suited for this purpose. The 'L' plates are distributed by Creators Ltd. Sole agents to the motor accessory trade are Towel Industries Ltd., of Blackburn

Polyhydrocarbides

By co-polymerization of ethylene with alpha olefines, polyhydrocarbides have been prepared, having good elastomeric properties. The properties as regards viscoelasticity of the amorphous co-polymers of propylene and ethylene are quite different from those of crystalline co-polymers from mechanical mixtures of both homopolymers. These co-polymers, the Italians report, have good dynamic properties even at low temperature. The flexibility of the macromolecules increases as a function of the increase of ethylene content, which is accompanied by a fall in the temperature of the minimum elasticity of rebound.

Silica in White Charges

The Roumanians have been investigating the dosage of silica in white charges. To distinguish colloidal silica quickly from alumina, kaolin or other charges eventually used in white rubbers, a quick method, they suggest, is to heat it with the aid of a few drops of perchloric acid, then with acid sulphate of potassium up to 600°C., a temperature at which SO_3 formed as a result gives, as a reaction with the metasilicates, silica and silicic acid. Having continued heating to 900°C., the crucible is plunged into cold water, after which a cast mass is extracted by the aid of hydrochloric acid. After boiling the extract is filtered and the residue dosed by weight after calcination.

Russian Research

The kinetics of the reaction of monosulphide of tetramethylthiurame with natural rubber and other rubbers differs from that of the di-sulphide, it is stated in the USSR. No formation of chemical retifications intervenes, and the sulphide of TMTM is fixed according to a curve which does not show the maximum. The addition varies according to the absence or presence of oxide of zinc. Simultaneously there occurs the thermal decomposition of the TMTM. The 'ghosts' of electronic paramagnetic resonance and the reaction with geraniol show that the di-sulphide and the mono-sulphide (TMTM) react upon one another with the rubber in passing to a free radical.

Rubber Statistics

UNITED KINGDOM — FRANCE — CANADA — THAILAND

DETAILS are now available of the rubber position in the United Kingdom up to the end of September. Imports of natural rubber during the first three-quarters of the year totalled 132,893 tons of crude and 24,222 tons of latex, and, after allowing for re-exports of 24,542 tons, there remained available for home consumption a new supply of 132,573 tons; this represented an increase of about 19,000 tons. Consumption of natural rubber to the end of September comprised 112,401 tons of crude and 20,149 tons of latex. Stocks at the end of September stood at 24,502 tons of crude and 4,651 tons of latex.

Imports of synthetic rubber during these three-quarters of the year totalled 61,235 tons, compared with 47,155 tons during the earlier period, while consumption rose from 46,706 tons to 56,590 tons.

Production of reclaim during these months amounted to 31,142 tons, or some 1,400 tons more than the comparable figure for last year. Consumption of reclaim amounted to 26,179 tons compared with 25,254 tons.

France

The Secretariat of the International Rubber Study Group has now published details of the French rubber position up to the end of July last.

During these first seven months of the year, French imports of natural rubber totalled 64,508 tons of crude and 6,666 tons of latex. Consumption of natural rubber during this period amounted to 72,639 tons of crude and 8,052 tons of latex. Stocks at the end of July stood at 4,408 tons of crude and 265 tons of latex.

Imports of synthetic rubber during these months amounted to 34,603 tons, of which 25,770 tons came from the US and 5,751 tons from Canada. Consumption of synthetic totalled 39,311 tons, an increase of more than 5,000 tons and included 27,651 tons of S-Type, 4,213 tons of neoprene, 5,503 tons of butyl and 1,145 tons of N-Type.

Canada

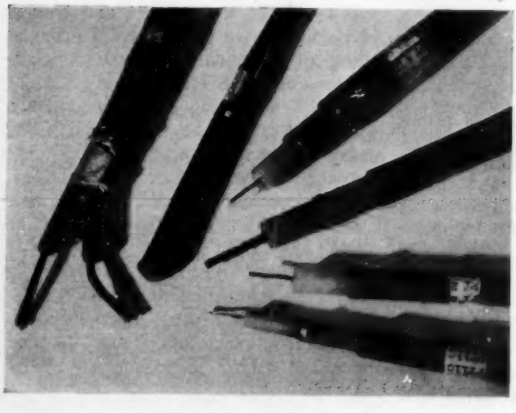
The Study Group also gives details of the Canadian rubber position up to the end of July. Imports of natural rubber totalled 22,731 tons of crude and 2,536 tons of latex, and exceeded the comparable 1958 figure by 7,500 tons. Malaya was the principal supplier, with 17,695 tons, while Ceylon sent 2,519 tons and the US 4,129 tons. Consumption of natural during these months totalled 25,837 tons, or some 6,700 tons more than in the earlier period, while stocks fell from the year-end figure of 4,467 tons to 3,619 tons.

Imports of synthetic rubber totalled 22,198 tons, coming principally from the US, while home production amounted to 41,855 tons; during the comparable period of 1958 imports had been very much lower at 6,508 tons, while home production had been almost twice as great at 75,102 tons. Consumption of synthetic amounted to 34,391 tons as against 26,755 tons, and stocks at the end of the period stood at 8,365 tons.

Local production of reclaim rubber amounted to 3,723 tons, while consumption stood at 10,523 tons, an increase of nearly 2,000 tons over the previous year. Stocks of reclaim at the end of September totalled 1,912 tons as compared with stocks of 1,400 tons held at the beginning of the year.

Thailand

Details have now been released of Thailand's rubber exports during the third quarter of the year. These amounted to 45,653 tons, and brought the total for the first three-quarters of the year to 128,354 tons, an increase of some 20,000 tons compared with the 1958 figure for the same period. The US took the greatest quantity of this rubber, with 88,673 tons, while 22,072 tons were sent to Malaya. Japan received 8,562 tons, and other countries taking this rubber included the UK (2,438 tons), Western Germany (3,267 tons) and the USSR (1,800 tons).



Some of the first cables using polythene for insulation are shown in this illustration. They are manufactured by the Telegraph Construction and Maintenance Co. Ltd.

Rubber Crop Returns

Unless otherwise indicated the figures quoted, to the nearest thousand lb., represent crop returns for the month stated and for the number of months of the planting company's financial year to date. Corresponding figures are given in parentheses.

HARRISONS AND CROSFIELD LTD.

October

Castlefield.—276 (225). 4 mths—1,096 (896).
Golden Hope.—796 (679). 8 mths—5,784 (4,953).
Holyrood.—82 (75). 10 mths—732 (639).
Hongkong.—27 (24). 10 mths—264 (205).
Hoscote.—231 (259). 4 mths—949 (950).
Killinghall.—48 (41). 4 mths—174 (152).
Kuala Selangor.—60 (51). 10 mths.—626 (499).
Kulai.—195 (202). 12 mths—2,372 (1,926).
Lanadron.—465 (454). 10 mths—4,321 (3,909).
London Asiatic.—1,665 (1,590). 10 mths—14,941 (13,875).
Malaysia.—47 (56). 10 mths—512 (556).
New Crocodile.—240 (238). 8 mths—1,866 (1,872).
Pataling.—1,294 (1,204) 12 mths—14,518 (12,135).
Prang Besar.—243 (196). 7 mths—1,742 (1,259).
Sandac.—90 (85). 7 mths—559 (508).
Sapong.—161 (160). 10 mths—1,495 (1,346).
Seaport.—65 (80). 4 mths—270 (315).
Strathisla.—107 (98). 16 mths—1,721 (1,488).

October

Malayalam.—931 (703). 7 mths—4,270 (4,091).
Lunuva.—118 (123). 10 mths—1,040 (1,174).

October

Allied Sumatra.—858 (937). 10 mths—7,453 (7,786).
Asahan.—90 (132). 3 mths—293 (364).
Bah Lias.—173 (181). 12 mths—1,802 (2,326).
Central Sumatra.—79 (101). 4 mths—266 (379).
Lankat Rubber.—80 (69). 7 mths—446 (431).
Mendaris.—216 (224). 10 mths—1,803 (1,956).
Namoe Tongan.—231 (282). 2 mths—475 (540).
Sialang.—235 (221). 9 mths—1,756 (1,695).
Soengei Rampah.—54 (55). 10 mths—518 (494).
Tanah Datar.—59 (90). 10 mths—665 (765).
Tandjong.—168 (140). 4 mths—627 (595).
Toerangie.—198 (247). 12 mths—2,319 (2,575).
United Lankat.—34 (37). 10 mths—282 (307).
United Serdang.—946 (1,048). 2 mths—1,776 (2,021).

Mr G. F. Plummer has been appointed vice-president and general manager of Dunlop Canada.

We extend our heartiest Christmas greetings to our friends at home and abroad and our best wishes for Prosperity and Happiness in the New Year

WITCO CHEMICAL COMPANY LTD

BUSH HOUSE, ALDWYCH, LONDON, W.C.2 PEARL ASSURANCE HOUSE, PRINCESS STREET, MANCHESTER 2
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Works at Union Lane, Droitwich Spa, Worcestershire
ALSO AT NEW YORK CHICAGO DETROIT AKRON BOSTON CLEVELAND

We wish all our many customers and friends in the Rubber Industry a Happy Christmas and a Prosperous New Year
REED BROTHERS
(ENGINEERING) LIMITED
Replant Works
Woolwich Industrial Estate
London, S.E.18
Telephone: Woolwich 7611-6

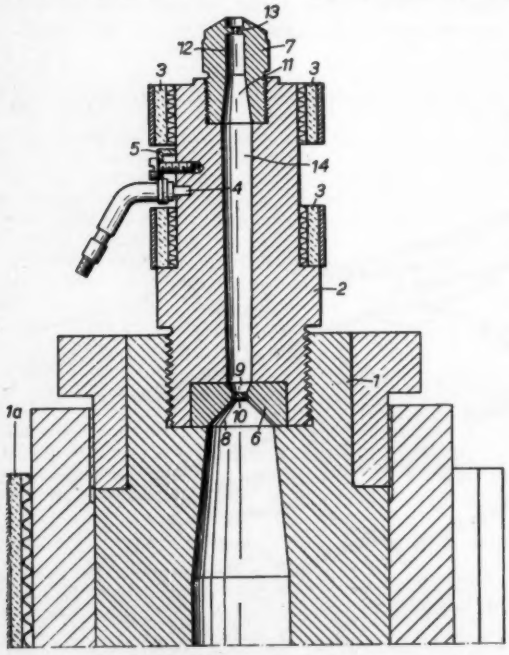
PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Plasticization and Homogenization Device for Injection Moulding Machines

No. 820,123. Maschinenfabrik und Giesserei Netstal A.G. Application and Filed, May 24 1956. Application in Switzerland, May 27 1955. Published, September 16 1959.

The invention is for a plasticization and homogenization device to be used in place of the usual nozzle head in a normal injection moulding machine to permit the injection moulding of PVC which is free of plasticizer and similar thermoplastic materials. The device comprises a flow passage for the thermoplastic material provided with two axially-spaced nozzles at the ends



of the passage, the sectional area of flow of the front nozzle being larger than that of the rear nozzle. As shown in the drawing, thermoplastic material is pressed into the plasticizing chamber in the member 1 and then through the nozzle 10 into the homogenizing chamber 14 and out through the nozzle 13 into the mould. The nozzle 10 generally has between 3 and 12 orifices but it may have a single orifice. The sectional area of flow of nozzle 13 is from 1.5 to 2.4 mm.², while that of nozzle 10 is from 0.5 to 0.6 mm.². The ratio between the sizes of the two nozzles may vary between 2:1 and 7:1, but it is preferably between 3:1 and 4:1. Heating elements 3 ensure that the material in the homogenizing chamber is brought to the temperature required to obtain the correct flow.

Bonding Textiles to Rubber

No. 815,860. United States Rubber Co. Application and Filed, February 26 1957. Application in USA, May 21 1956. Published, July 1 1959.

Textiles such as cotton, rayon and nylon are bonded to natural rubber, SBR or rubber reclaim compositions by means of an adhesive formed by reacting resorcinol with a reaction product of formaldehyde and a 1,3-diaryl guanidine. One procedure consists in mixing the resorcinol into the rubber and applying the diaryl guanidine-formaldehyde reaction product to the textile material, the rubber and textile then being united and the assembly heated to cause the resorcinol to react with the diaryl guanidine - formaldehyde reaction product to form the adhesive. An alternative procedure consists in mixing both the components of the adhesive into the rubber and then applying the rubber to the textile and heating, but it is essential that the reaction temperature of the components is not reached before the rubber is applied to the textile.

The new adhesives are intended particularly for use in the construction of tyre casings instead of the usual latex adhesives. Results of laboratory tests show the improvement effected in the mechanical stability of laminates of rubber and tyre cord (rayon and nylon) by incorporating the adhesive-forming components in the rubber stock according to the process of the invention compared with the use of a latex adhesive.

Shorter Abstracts

Thermoplastic Compositions. 815,250. Imperial Chemical Industries Ltd. Filed, July 31 1957.—A thermoplastic moulding composition having a high impact strength comprises a blend of (1) polymerized methacrylonitrile or a methacrylonitrile-methyl methacrylate copolymer and (2) a rubbery copolymer of butadiene, particularly a butadiene-acrylonitrile copolymer.

Adhesive Tape. 815,823. General Electric Co. Filed, February 13 1956.—Irradiated polythene is used as a backing for pressure-sensitive adhesive tape. The polythene may be irradiated by the process described in Specification No. 773,529.

Transparent Rubber Articles. 816,018. Farbenfabriken Bayer A.G. Filed, January 28 1957.—Transparent rubber articles are made directly from natural rubber latex by incorporating a small proportion of a nitrosamine, preferably diphenyl nitrosamine, in a latex composition containing vulcanizing ingredients.

Vulcanization of Latex. 816,230. Revertex Ltd. Filed, April 3 1957.—Natural rubber latex is vulcanized in latex form by exposing the latex to a radiation dosage between 1 and 60 megarads, preferably between 10 and 40 megarads.

Plasticizers. 816,528. Dehydag Deutsche Hydrierwerke GmbH. Filed, March 26 1957.—Acetals and ketals of esters of hydroxycarboxylic acids are claimed as plasticizers for polymers such as PVC, polyamides, polyesters, rubber, chlorinated rubber, etc.

Polymerization. 816,579. Montecatini Societa Generale per l'Industria Mineraria e Chimica. Filed, November 8 1955.—Graft polymers are used as dispersing agents in the polymerization of vinyl monomers in aqueous suspension. Examples of suitable graft polymers are vinyl chloride-polyvinyl alcohol and styrene-polyacrylic acid.

COMPANIES in the NEWS

Australian I.C.I.

Imperial Chemical Industries of Australia and New Zealand has raised the ordinary dividend from 9% to 10% with a final of 6½%. Following record sales of £A61m. the parent's profit for the year to September 30 1959, rose from £A2,720,000 to £A2,837,000. Tax took £A540,000 and depreciation £A1,247,000. Total ordinary and preference dividends take about £A1¾m.

Prang Besar

The company has recently purchased from Klanang Produce Co. Ltd. for £192,500 cash that company's Galloway Estate, Selangor, comprising 1,494 acres (1,158 acres planted rubber—436 acres unselected, 722 acres selected of which 397 acres are immature) for completion on December 31 1959. Galloway estate is situated in close proximity to Prang Besar/Bukit Prang Estates.

The board of the Chemical and Insulating Co. Ltd. has been reconstituted and is now as follows: D. J. Grant, chairman; F. R. Gibson, managing director; G. Banks, K. C. Plumbe, and F. Sawdon.

Rubber and Plastics Stock Market

A REVIEW OF PRICES AND TRENDS

MANY leading shares have reached new peaks and truly it can be said that investors never had it so good. Yet the surprising thing is that trading activity has been on a much quieter scale over the past few weeks.

The aggressive buying which occurred immediately following the post Election period has subsided.

Demand is more selective now and the temptation to cash in on big paper profits keeps growing.

But dealers report that for every seller, there is, at the moment, a buyer only too willing to step forward to take his place.

In fact one of the big reasons for the latest joyride in prices is that there is an acute shortage of shares.

One way and another all the pointers indicate that market-wise this is going to be a very merry Christmas for shareholders.

What is backing up the kind of optimism that we are at present witnessing?

Good news. It is pouring out from all directions like a great tidal wave.

One of the really big company announcements, of course, came from the giant DISTILLERS combine.

It contained a half-yearly report and dividend which showed an increase of 1% to 5%.

This step-up was in line with a forecast made earlier this year.

Trading profits, after depreciation, are estimated at £14,686,000 for the six months to September 30.

They compare with £12,841,000 for the same period in 1958. Income from trade investments declined from £738,000 to £430,000.

The directors added that so far during the second half of the current year, trading results continue favourable.

With one mild reservation, they confidently expect that the year's results will be satisfactory.

On the whole these figures and comments were well received in the market and the 10s. shares improved to 36s. 7½d., only 1½d. below the high for the year.

Another lively performer was TURNER AND NEWALL. The day after the dividend news there was a 9s. 10½d. spurt in the shares to 97s. 10½d.

In cash terms this added something like £11 million to the market value of the shares.

As an industrial leader they never stopped going up and have now swept ahead to 104s., best ever for 1959.

That other old 'blue chip' favourite, I.C.I., has been in buoyant mood too. Further demand pushed them smartly on to 56s. 6d.

BRITISH INDUSTRIAL PLASTICS made more gentle progress in front of the full results due next month.

Those close to this market have been cautious about forecasting dividend prospects.

This is no surprise in view of the warning about profit margins in the last annual statement.

But no doubt shareholders would

Continued on page 824

Share Price Movements

Par Value	Company	1958-59 High	Low	Nov. 7	Latest
5/-	Albright & W. Ord. ..	29/6	13/4½	28/-	26/9
£1	„ „ „ 5% Pref...	18/6	15/4½	16/3	18/6
5/-	Anchor Chemical Ord. ..	23/-	10/3	18/-	22/9
5/-	Andersons Rub. Ord. ..	4/3½	3/-	3/1½	3/1½
£1	Angus Geo. Ord. ..	37/6	21/-	34/6	37/-
5/-	Ault & Wiborg Ord. ..	23/-	11/9	21/-	21/9
£1	Avon India Rubber Ord.	46/3	27/-	42/6	46/3
£1	„ „ „ 6% Pref.	18/6	17/3	17/6	17/6
10/-	Bakelite Ord.	40/-	17/-	40/-	38/-
£1	„ 6% Pref. ..	19/6	18/3	18/9	18/3
£1	Baker Perkins Ord. ..	53/-	30/7½	49/6	52/6
4/-	Bank Bdg. Rubber Ord.	3/1½	1/6	3/1½	3/-
5/-	Boake (A) Roberts Ord...	25/6	9/-	19/6	24/9
£1	„ „ „ 5% Pref.	15/1½	13/9	15/-	15/-
4/-	Brammer H. Ord. ..	16/6	9/6	15/7½	16/-
10/-	Bridge, David Ord. ..	46/3	16/3	36/10½	46/3
5/-	Bright, John Ord. ..	18/3	8/9	16/3	18/-
2/-	Brit. Ind. Plas. Ord. ..	10/-	4/9	9/7½	10/-
2/-	„ 10% (tax free) Pref.	5/9	4/9	4/1½	4/3
£1	British Xylonite Ord. ..	75/-	28/6	69/9	75/-
£1	„ „ 5% Pref.	15/9	14/-	15/7½	15/9
5/-	BTR Ind. Ord.	13/3	8/1½	10/3	8/9
£1	„ „ 7½% Pref. ..	24/3	20/9	22/6	23/9
£1	Courtaulds Ord... ..	60/9	20/-	52/9	60/9
£1	„ 5% 1st Pref.	18/9	15/7½	17/-	17/6*
£1	„ 6% 2nd Pref.	21/9	17/1½	20/3	21/-
4/-	Cow, P. B. Ord... ..	7/3	3/6	6/9	6/7½
£1	„ „ 5% Pref. ..	15/-	10/9	14/3	15/-
1/-	Dannimac Mfg. Ord. ..	10/-	2/6	8/3	9/9*
10/-	De La Rue Ord. ..	69/-	42/9	61/3	67/6
£1	„ „ „ 3½% Pref. ..	12/3	10/-	12/-	12/6
10/-	Distillers Co. Ord. ..	36/9	15/9	32/6	36/7½
£1	„ „ 6% Pref...	22/3	19/10½	21/3	22/-
£100	„ 5% Conv. Loan	£96½	£91	£94½	£94½
£100	„ 5½% Unsec. Loan	£97	£87 7/16	£93	£96½
10/-	Dunlop Rubber Ord. ..	29/-	14/9	29/-	26/4½
£1	„ 5½% Pref.	19/4½	15/10	19/-	19/1½
£100	„ 3½% 1st Debs.	£77½	£67¾	£77½	£77½*
£100	„ 4½% 2nd Debs.	£86½	£78	£82½	£86
4/-	Ebonite Cont. Ord. ..	15/3	7/6	11/6	13/6
£1	English China Clays Ord.	78/9	29/9	75/-	78/6
£1	Goodyear Tyre 4% Pref.	12/9	12/-	12/6	12/6
5/-	Greeff Chem. Ord. ..	31/3	14/-	30/9	31/-
10/-	„ „ 5½% Pref.	8/6	7/9	8/-	8/3
4/-	Greengate & Irwell Ord.	7/0¾	4/1½	5/-	5/7½
£1	Harrisons & Crosfield Dd.	83/3	43/9	76/3	55/-†
1/-	Hunt & Moscrop Ord. ..	2/1½	1/1½	2/1½	1/10½
£1	Imp. Chem. Ord. ..	56/6	28/3	54/6	56/6
£1	„ „ 5% Pref. ..	18/10½	16/-	18/6	17/3*
£100	„ 4½% Unsec. Loan	£90	£80	£88	£87½
£100	„ 5½% Conv. Loan	£175	£99	£173	£174
1/-	Kleemann (O. & M.) Ord.	8/9	2/6	7/6	8/9
£1	„ „ 6½% Pref.	18/3	15/-	17/3	18/4½*
2/-	Lacrinoid Prod. Ord. ..	3/1½	1/5¾	2/3	3/-
5/-	Laporte Ind. Ord. ..	27/6	13/7½	26/-	27/3
£1	„ „ 7½% Pref.	23/9	21/10½	23/9	23/9
£1	Leyland & Birm. Rubber Ord.	58/9	39/9	52/6	50/-
£1	„ „ „ 6% Pref.	21/3	16/1½	16/10½	18/-
2/-	London Rubber.. ..	13/9	6/3	12/-	13/9
£1	„ 6% Red. Cum. Pref.	19/9	16/3	18/9	18/9*
£1	McKechnie Bros. Ord...	62/6	23/6	61/3	61/3
£1	„ „ 'A' Ord.	62/6	30/-	60/-	61/-
£1	„ „ 6% Cum. Pref.	17/-	16/-	17/-	17/-
5/-	Monsanto Chem. Ord. ..	23/-	13/-	21/-	23/-
£1	„ „ 3¾% Pref.	13/6	11/-	13/-	12/6
£100	„ „ 6% Debs.	£104	£101½	£103	£102½*
£1	North British Rubber ..	20/1½	15/7½	16/9	18/3
5/-	Redfern Holdings Ord...	5/9	2/10½	5/-	5/7½
2/-	RFD Ltd. Ord.	6/6	3/5¼	6/-	5/6
£1	„ „ 5½% Pref. ..	16/-	11/6	14/9	16/-
2/-	Rubber Imp. Ord. ..	15/6	4/4½	6/-	4/4½
2/-	„ „ 'A' Ord. ..	14/3	3/9	5/-	4/1½
£1	„ „ 5% 1st Pref.	13/-	10/-	10/-	13/-
5/-	Rubber Reg. Ord. ..	15/9	10/6	13/6	15/9
4/-	Shaw Francis Ord. ..	21/9	9/9	20/3	21/9
2/-	Silentbloc Ord.	10/3	7/6	9/6	10/1½
2/-	Sussex Rubber Ord. ..	1/11½	7½	1/7½	1/7½
5/-	Sutcliffe Speak Ord. ..	10/-	5/-	10/-	9/9
£1	Turner & Newall Ord. ..	104/-	52/-	91/-	104/-
£1	„ „ „ 7% Pref.	25/6	22/1½	24/3	24/9
5/-	Universal Asbestos Ord.	31/3	8/0¾	27/6	30/-
5/-	Viscose Dev. Ord. ..	13/9	6/3	11/6	13/9
5/-	Warne William (Holdgs.) Ord.	17/6	8/-	14/7½	17/6

*Ex-dividend †Ex-scrip issue

Rubber Markets

LONDON

Once again London prices for rubber have been nearly always a reflection of those prevailing in the East, and with lower levels again reported on that centre there has been a steady downward drift here. With the squeeze of a few weeks ago now a thing of the past, stocks appear adequate to meet the demand and the spot price is more than a halfpenny lower on the week, while falls in certain of the nearer future positions are a penny or more lower.

Latest prices are as follows:

No. 1 RSS Spot: 34¼d.-34½d.

Settlement House:

January 33⅞d.-34¼d.

February 32⅝d.-32⅞d.

March 31½d.-31⅝d.

January/March 32⅝d.-33d.

April/June 31½d.-31⅝d.

July/September 30⅜d.-30⅝d.

October/December 29⅝d.-29⅞d.

Cif Basis Ports:

December 33¼d.-33½d.

January 33⅜d.-33⅝d.

Godown:

January 113¼ (Straits cents).

LATEX

Centrifuged latex per gallon in drums, January 20s. 3d., February 20s. 3d., March 20s., cif European ports. Spot, 21s. Bulk, nominal, 19s. 10d. Creamed, seller, January, 19s. 9d. Normal, seller, 15s. 5d.—January/February.

AMSTERDAM

The Amsterdam rubber market ruled as under on December 11:

	Guilders per kilo	
No. 1 RMA	Dec. 11	Previous
December ..	3.35	3.37
January	3.22	3.25
February	3.22	3.25
March	3.22	3.25
January/March ..	3.22	3.25
April	3.06	3.09

Sales: Nil. Tendency: Easy

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on December 11 was 38 (closed) US cents per lb.

SINGAPORE

After opening slightly lower than the previous day's final levels and drifting slowly to the 117 cent level for January, the market eased sharply on the publication of the November import figures on December 11. Thereafter, the market ruled quiet and featureless. There was some selling pressure on December No. 1 RSS. Lower sheets were neglected. The afternoon market was active with last-minute covering of December. Offerings were well absorbed and the downward tendency was halted after only a mild drop. The market finished on a quiet note.

	Straits cents per lb. fob Malayan ports to open ports	
	Close	Previous Close
No. 1 RSS, Dec. ..	117⅛–117⅜	119¼–119½
Jan. ..	116 –116½	118– 118¼
No. 2 RSS, Dec. ..	116½–117⅛	118½–119½
No. 3 RSS, Dec. ..	116 –117	118½–118⅝
No. 4 RSS, Dec. ..	114½–115¼	116½–117¼
No. 5 RSS, Dec. ..	111½–113	113½–115½
No. 1 RSS, Spot ..	117⅞–118½	119⅞–120⅜
No. 3 RSS, blanket thick remilled, Dec.	113½–115½	115 –118
Int. No. 1 fine pale crepe, Dec. ..	132½–135½	133½–136½
2X thin brown crepe, Dec. ..	112½–113½	113½–115

Tone: Quiet.

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 205.80d. per gallon.

CEYLON

No. 1 RSS

The price for No. 1 RSS, spot, at Colombo on December 11 was 135 (138½) Ceylon cents per lb.

NEW YORK

The New York rubber market ruled as under on December 11:

DEALERS' PRICES

	Ex-dock, US cents per lb.	
	Dec. 11	Previous
No. 1 RSS, Dec. ..	41¼a	41⅛b–41⅜a
Jan. ..	41⅜a	41⅜b–41⅝a
No. 2 RSS, Dec. ..	41⅜a	41⅜b–41⅝a
Jan. ..	41¼a	41⅛b–41⅜a
No. 3 RSS, Dec. ..	41¼a	41⅛b–41⅜a
Jan. ..	41⅜a	41⅜b–41⅝a
No. 1 RSS, Spot ..	41⅜a	41⅝n
No. 3 amber blanket crepe, Feb.	39b–39¼a	39¼b–39½a
No. 1 latex thin crepe Dec.	43⅞n	44⅛n
No. 1 latex, thick crepe, Dec. ..	44⅜n	45t

FUTURES—REX CONTRACT

	US cents per lb.	
	Close	Prev. Close
Jan. ..	41.20t	41.70b–41.80a
March ..	39.20t	39.75t
May ..	37.85b–38.00a	38.40t
July ..	37.00b–37.20a	37.35b–37.50a
Sept. ..	36.60b–36.85a	36.85b–37.10a
Nov. ..	36.20b–36.45a	36.35b–36.60a
Jan. ..	35.80b–36.05a	35.85b–36.10a

Sales: 60. Tone: Easy

Rubber futures eased on scattered liquidation on December 11, following the decline abroad, according to traders. The trading volume was very thin. Physicals were quiet. One leading importer said there was some interest in nearby rubber but December shipment offerings were limited and sellers were reluctant to sell nearbys fearing they would have difficulty in covering their sales. There was no factory interest for more distant positions. In late trading, rubber futures continued easy.

DJAKARTA

Small quantities of estate rubber were sold at 58 rupiahs per kilo on December 11. Buyers were holding off, awaiting further developments in Singapore. The market closed quiet. No. 1 sheet for ready delivery was quoted 75 cents below the previous day's closing level at 56 rupiahs per kilo buyers.

	Rupiahs per kilo	
	Dec. 11	Previous
Spot No. 1 Priok ..	56.00b	56.75b
Spot No. 2 Priok ..	55.00b	55.75b
Spot No. 3 Priok ..	54.00b	54.75b
No. 1 fine pale crepe, spot	50.00b	51.00b

Tone: Quiet, dull.

STOCK MARKET

Continued from page 823

welcome a small increase. Their dividend has been unchanged now since 1955.

How have the other plastic firms done over the past few weeks?

The 10s. shares of BRITISH XYLONITE received good support and now stand at 75s.

DE LA RUE have also done very well, buyers lifting them to 67s. 6d.

BAKELITE on the other hand, have eased a little. But at 38s. the yield is only £3 16s.%, which might be part of the explanation.

The results from RUBBER IMPROVEMENTS were a big disappointment to one and all.

A £410,000 profit has been turned into a loss of £149,000. There was no dividend this time against 45%.

This result knocked the shares hard. At 4s. 4½d. they are now among the selected band of those who, at the present time, stand at their 'lows' for the year.

New Shell SR

The Shell Chemical Co. Ltd. announces the addition of a resin/rubber masterbatch to the 'Cariflex' range of synthetic rubbers. This product, 'Cariflex' SP-103, consists of equal parts of high styrene (styrene/butadiene 85/15) and low Mooney viscosity (30 to 38) rubber of the S-1509 type. The combined styrene content of the masterbatch is approximately 54%.

'Cariflex' SP-103 is light in colour, non-discolouring and non-staining and is suggested as a convenient source of pre-dispersed resin for micro-cellular and sponge-soling, floor compositions and hard rubber products. The presence of the low Mooney cold rubber facilitates the uniform incorporation of SP-103 in compounds of this type.

The product is available in crumb form at 28d. per lb., ex-store, packed in 50lb. bags.

Industry INTELLIGENCE

Technical Data

Continuous Vulcanization of Neoprene Extrusions in Liquid Curing Media

A method for continuously curing neoprene extrusions by passing the extrusions through a tank containing a heated liquid curing medium (LCM) has been developed at the Du Pont Elastomers Laboratory. The equipment required for this new process and the compounding of the neoprene are described by M. A. Schoenbeck in Du Pont Report BL-357, distributed in the UK by the Du Pont Co. (UK) Ltd., 76 Jermyn Street, London, S.W.1.

The extruder is the key to the success of the LCM process as it must remove entrapped air, which is normally found in elastomer stocks, in addition to its primary function of extrusion. If entrapped air is not removed, porosity will develop in the extrusion during cure as no pressure is applied in the process. For maximum utilization of the LCM process, a vacuum extruder is recommended to ensure removal of the entrapped air from the stock, but such an extruder is not essential. The design of a suitable vacuum extruder is described. Heat-stable organic liquids, *e.g.* polyalkylene glycols containing a heat-stabilizing antioxidant, can be used for curing at temperatures up to about 500°F., but for curing at higher temperatures, molten metals are used. Curing systems for the LCM process are discussed and mixes are given suitable for solid and sponge neoprene extrusions. The LCM process is particularly attractive for extrusions required in large quantities, as for motor vehicles.

Benzylamine and Dibenzylamine

Technical Bulletins on benzylamine and dibenzylamine have been issued by Robinson Brothers Ltd., Ryders Green, West Bromwich. These contain data for the physical properties of the two amines and a survey of their chemical reactions and uses, with literature references.

Benzylamine has been used as an ingredient in making polymers. Acrylonitrile, formaldehyde and benzylamine react together to form a water-insoluble polymer, while water-soluble syntans may be obtained by reacting lignin, formaldehyde and benzylamine. Polymers are also formed from benzylamine and (a) ethylene diacrylate or (b) ethylene diacrylate and ethylene diamine.

Dibenzylamine reacts with carbon disulphide to form dibenzylammonium dibenzyldithiocarbamate, which can be used as a vulcanization accelerator. Zinc dibenzyldithiocarbamate, available from Robinson Brothers, is a non-staining, non-discolouring ultra accelerator suitable for use in dry rubber, latex and rubber cements. A mixture of dibenzylamine and carbon disulphide has been patented as a curing system for Neoprene GN cements at room temperature. Dibenzylamine may also be used as an anti-scorch agent for butyl and other rubbers where the p-quinone dioxime-red lead accelerator system is used.

Machines, Materials and Equipment

Labelling Tool

A simple hand-held tool that will dispense printed labels from a reel of material contained in a magazine in the handle is manufactured by Hellerman Ltd., Gatwick Road, Crawley, Sussex. The tapes supplied for use with the machine are of ¼in. wide plastic in a variety of colours, or of aluminium. In the case of the coloured plastics, the machine produces an embossed lettering in white, and in the case of aluminium, a plain raised lettering. Both plastic and aluminium tapes have a pressure-sensitive adhesive backing.

Skiving Machinery

Skiving and splitting machinery manufactured by Fortuna-Werke Spezialmaschinenfabrik A.G., is now being marketed by F. J. Edwards Ltd., 359-361 Euston Road, London, N.W.1, the German company's sole UK agents. For bevelled or parallel splitting cuts up to 2in. wide, the SAS standard skiving machine will produce cuttings with straight and curved edges from vulcanized or non-vulcanized rubber or similar material, used for making rubber balls, bladders, containers, tubes for automobiles, motorcycles and bicycles, wrappings, linings, air rafts, etc., as well as stiffeners, soles, etc., for rubber shoes and the like. The complete unit ready for use consists of the machine with treadle and telescopic bar, tubular bench with electrical equipment, scrap chute and container. Important features include: variable feed control at constant knife speed, permanently sharp knife which is constantly reground during operation, smooth engaging by free treadle—adaptable to any foot position, and treadle lock for continuous feed. Another machine in the range for the rubber industry is the SAS corded-rubber skiving machine, with driven upper feed roller. It is suitable for skiving corded-rubber patches up to about ¼in. or ⅜in. thick by 2in. wide. Wider bevels up to about 5in. can be achieved by 2-3 operations. Additional equipment for the occasional skiving of soft rubber can be supplied. The machine is supplied either on a column stand or tubular work bench with scrap chute and container, both with full electrical equipment.

The SAS corded-rubber skiving machine (with driven upper feed roller) mounted on a tubular work bench

New Publications

Tableware in Melamine Plastics

Melamine plastics tableware is the subject of a specification (BS 3167: 1959) recently issued by the British Standards Institution. The articles covered by this seven-page booklet are cups, saucers, plates, dishes, bowls, beakers, mugs, compartmented trays and similar utensils. The publication specifies criteria to be reached if such 'crockery' is to earn the mark 'BS 3167' or, if the manufacturer is licensed, the 'Kitemark.' The articles are to be made of alpha-cellulose filled melamine formaldehyde moulding material of a specified BS quality. An important hygienic safeguard is that they must not contain 'constituents extractable by foodstuffs under normal conditions of use in quantities sufficient to be injurious to health.'

One test quoted requires articles to remain in a temperature of 170° ± 5°F. for eight hours; subsequently they must not develop cracks or show surface marking or any other defects, and there must be no more than a 4% change in the internal volume. Another test requires articles to withstand satisfactorily for 24 hours a temperature of between 32°F. and 20°F.

'Most plastics materials,' states the foreword to the standard, 'permit the build-up of surface deposits, which can cause eventual staining; but such deposits can normally be readily removed by correct and prompt cleaning procedures; permanent staining can thus be prevented.' Copies of this Standard can be obtained from the BSI, Sales Branch, 2 Park Street, London, W.1. Price 3s.

Export Opportunities

Small Plastics Containers for Western Germany

Herr Heinz Weber, Krahnsbergerweg 10, Praunheim, Frankfurt, has informed the British Consulate-General at Frankfurt, that he would like to represent, for the area of Land Hesse only, UK manufacturers of the following products: Small volume plastics containers for the chemical and cosmetic industry, blown or die-cast; aluminium and plastics foils (with the exception of polythene); special wrapping paper; small glass tubes and containers. Herr Weber would not be interested in any products which, owing to freight charges, would be unable to compete with products of local manufacture.

Manufacturers interested in this agency enquiry should write direct to Herr Heinz Weber, and should notify the British Consulate-General, Zeppelinallee 47, Frankfurt, that they have done so. B.o.T. reference: ESB/24091/59.

Western Germany

Herr F. Fehring, senior partner of 'Isola' Bautenschutz-Vertriebs GmbH., Salzkotten i/W, Postfach 17, has informed the British Consulate-General at Düsseldorf that his firm have available at Langenfeld, between Düsseldorf and Cologne, a plot of land of about 7,000 sq. yd. in area which would be suitable for the erection of a new building for manufacturing purposes. Several offices and a depot of about 200 sq. yd. already exist. Herr Fehring would be interested in an arrangement with a UK firm wishing to manufacture in Germany and who would like to have the advantage of Isola's sales organization to market their products.

Isola's main interest is in plastics floor coverings or other products used in the building or furnishing trades.

Manufacturers interested in this enquiry should write direct to Herr F. Fehring, and should notify the British Consulate-General, Cecilienallee 16, Düsseldorf, that they have done so. B.o.T. reference: ESB/27545/59.

The address of the Export Services Branch of the Board of Trade is Lacon House, Theobalds Road, London, W.C.1. Telephone number: Chancery 4411, extensions 776 or 866.

Latest Wills

Mr George Herbert Redman, J.P., C.B.E., of Levens Lodge, Moss Lane, Leyland, near Preston, Lancs., managing director of J. E. Baxter and Co. Ltd., Leyland, Lancs., who died on September 7, left £45,428 8s. 8d. gross, £42,880 5s. net value.

Lt.-Col. Cecil Walter Stanley Gardner, of Lomas, Sandhurst, Kent, farmer, late chairman of Parambe Rubber Co. of Ceylon Ltd., Woodend (Kelani Valley, Ceylon) Rubber and Tea Co. Ltd., and Sungei Rinching Rubber Estates Ltd., and director of a number of other rubber companies, who died on June 4 last, left £42,664 0s. 9d. gross, £28,282 8s. 6d. net value.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

CEDSPAN (790,701) for expansion joints made wholly or principally of rubber. By Civil Engineering Developments (Thurrock) Ltd., London Road, West Thurrock, Grays, Essex.

FABRILAY (790,473) For all goods included in Class 24. By Commercial Plastics Ltd., Willington Quay, Wallsend-on-Tyne, Northumberland. To be associated with No. 745,510 (4056, 186) and others. (Class 24; October 7 1959.)

FABLONEX (790,592) For all goods included in Class 24. By Commercial Plastics Ltd., Willington Quay, Wallsend-on-Tyne, Northumberland. To be associated with No. 674,749 (3744, 23) and another. (Class 24; October 7 1959.)

SIROCCO (787,956) For articles of clothing, none being made of india rubber. By D. Marshall and Co. Ltd., 17 Minshull Street, Manchester 1. To be associated with No. 787,955 (4232, 967). (Class 25; October 7 1959.)

PRITEX (786,166) For foamed plastics in sheet and strip form, and articles made therefrom, all included in Class 17. By Pritex (Plastics) Ltd., Staplegrove Mills, Wellington, Somerset. (Class 26; October 7 1959.)

(B783,258) For plastics in the form of sheets, rods, tubes and shaped sections, and articles made therefrom, all included in Class 17. By Preformed Line Products Co., 1414 Union Commerce Building, Cleveland, State of Ohio, United States of America. Address for service is c/o A. A. Thornton and Co., Northumberland House, 303-306 High Holborn, London, W.C.1. (Class 17; October 7 1959.)

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on September 30 1959

Vinyl Products Ltd. Manufacture of polyvinyl acetals. 821,092.

Geigy Co. Ltd. Polymerization of unsaturated organic compounds. 821,093.

Eastman Kodak Co. Fibres, filaments and yarns made from a mixture of cellulose acetate and a polymer. 821,097.

Ciba Ltd. Process for fixing aminoplasts by the wet method on cellulose-containing fibrous materials. 820,946.

Union Carbide Corporation, formerly Union Carbide and Carbon Corporation. Vinyl chloride-alkyl acrylate interpolymers and process for their preparation. 821,035.

Imperial Chemical Industries Ltd. Catalyst systems for polymerization of unsaturated compounds. 821,142.

Imperial Chemical Industries Ltd. Polymerization of olefins. 821,107.

Agfa A.G., formerly Agfa Aktien-Gellschaft Für Photo-Fabrikation. Foils consisting of highly polymeric substances pre-treated for the application of hydrophilic colloids. 820,865.

Oppenheimer Casing Co. (U.K.) Ltd. Apparatus for welding thermoplastic films together. 820,894.

Dobeckmun Britain Ltd. Threads of thermoplastic material and their manufacture. 821,149.

Badische Anilin- and Soda-Fabrik A.G. Production of polymers of olefinically unsaturated hydrocarbons. 820,965.

Monsanto Chemical Co. Moulding foamed resin articles. 820,966.

Imperial Chemical Industries Ltd. Stabilized polypropylene. 820,967.

Imperial Chemical Industries Ltd. Polymerization of organic isocyanates. 821,158.

Imperial Chemical Industries Ltd. Process for manufacture of coloured synthetic polyamide and synthetic polyester fibres. 820,975.

Polymer Corporation Ltd. Catalytic dehydrogenation of olefins. 820,905.

Hedwin Corporation. Method of continuously manufacturing plastic containers. 821,173.

NEW COMPANIES

Basildon (Industrial Estate) Tyre Services Ltd. (643,828).—December 4. Capital: £50,000 in £1 shares. The first directors are: Eric Shackleton and Beryl Shackleton, both of 21 Pembury Road, Westcliff-on-Sea, Essex. Solicitors: Cadman, Grylls and Co., Cleckheaton.

Gunham Plastics Ltd. (643,667).—December 3. Capital: £1,000 in £1 shares. To carry on the business of manufacturers of and dealers in plastic substances and plastic sheets and mouldings, etc. The directors are: Frederick J. Hammond, 1A Newbury Parade, Newbury Park, Essex; Arthur J. Gunton; Mrs Margaret S. C. Gunton; both of 136 Morton Way, N.14. Regd. office: 50 Hoxton Square, London, N.1.

Continental Plastics Ltd. (643,715).—December 4. Capital: £500 in £1 shares. To carry on the business of manufacturers of and dealers in plastic substances and materials of all kinds, etc. The directors are: Reginald C. Simmons, 11 Cranborne Road, Hatfield; Harold Duckworth, 10 Selwyn Drive, Hatfield; William G. Drever and Frank T. Reynolds. Regd. office: 1 The Parade, St. Albans Road, Hatfield, Herts.

Easy-Way Spray Enamels Ltd. (643,660).—December 3. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plastics, paints, lacquers, varnishes and enamels, etc. The first directors are to be appointed by the subscribers. Solicitors: Henry Goldblum and Co., 20 Melcambe Street, London, N.W.1.

Verson Engineering Co. Ltd. (643,487).—December 1. Capital: £15,000 in £1 shares. To acquire the business of mould makers to the rubber and plastic trades carried on by D. E. Oliver at Middleton Junction, Manchester, etc. The directors are: Donald E. Oliver and Mrs Freda M. A. Oliver, both of 19 Woodfield Road, Alkrington, Middleton, Lancs., and Albert P. Haslip, 24 Mills Hill Road, Middleton Junction. Regd. office: Moston Road, Greengate, Middleton Junction, Manchester.

Kalumpong Rubber Estates Ltd. (643,676).—December 3. Capital: £100 in £1 shares. The first directors are not named. Solicitors: Slaughter and May, 18 Austin Friars, London, E.C.2.

Permalink Ltd. (643,470).—December 1. Capital: £100 in £1 shares. To carry on the business of manufacturers of and dealers in plasticizers, polyvinyl pastes, paints, etc. The permanent directors are: John A. Briggs, Newlands, Park Hill Road, Hale, Ches.; Leonard W. E. Townsend, Paxford, Holly Road, Wilmslow, Ches.; Ben Collins, 789 Rippendon Road, Oldham. Regd. office: 4 Commercial Street, Knott Mill, Manchester, 15.

Increases of Capital

H. Marks Ltd. (324,308). Waterproof manufacturers, etc., Quelrayn Works, 168 Waterloo Road, Manchester, 8.—Increased by £150,000, in £1 ordinary shares, beyond the registered capital of £100,000.

British Artid Plastics Ltd. (339,177). 361/3 Buckingham Avenue, Trading Estate, Slough.—Increased by £20,000, in £1 non-voting shares, beyond the registered capital of £20,000.